PERIODICAL ROOM
GENERAL LIBRARY
UNIV. OF MICH.

November 4, 1935

STEEL

935

PRODUCTION • PROCESSING • DISTRIBUTION • USE

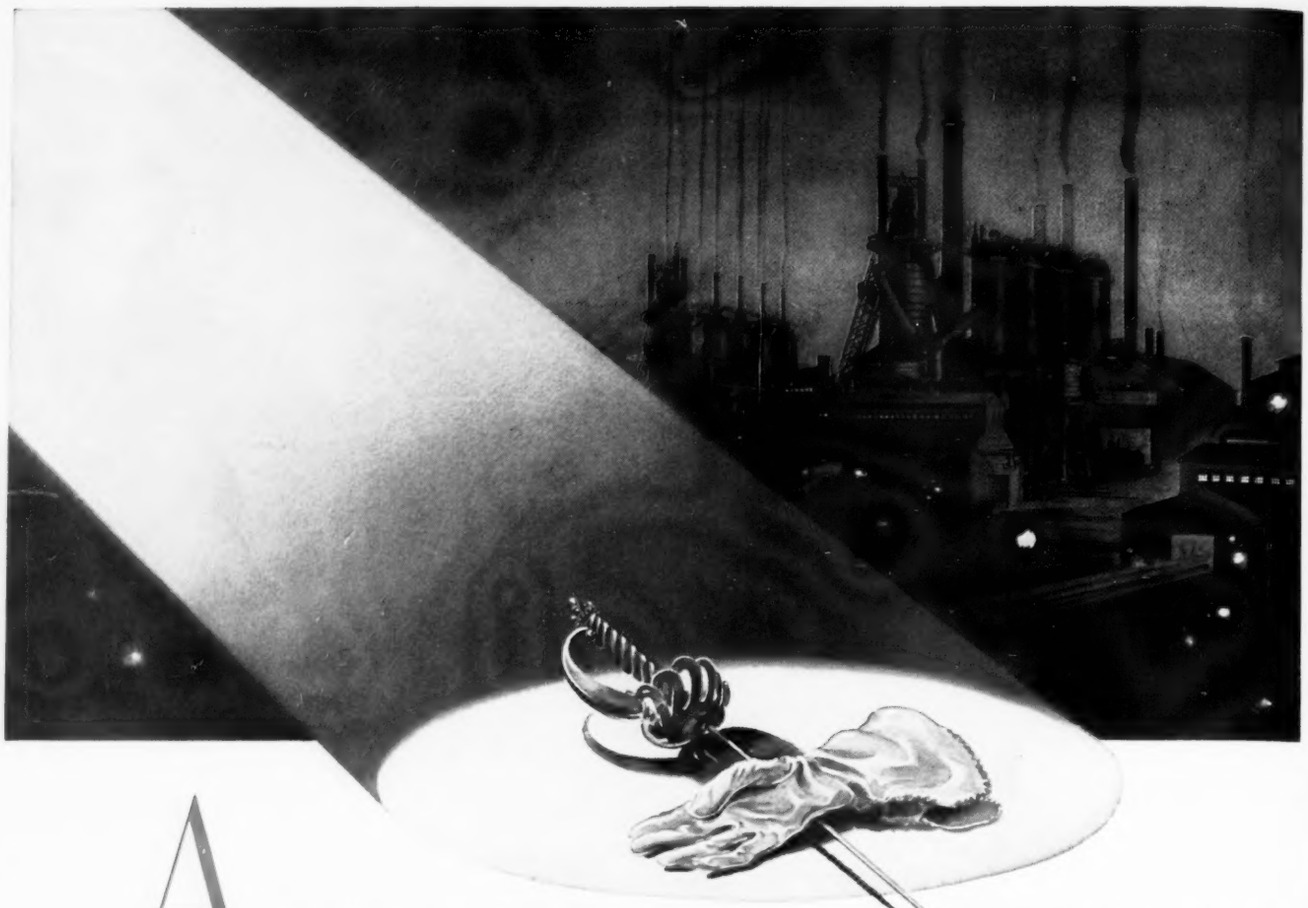
FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

LEWIS
ROLLING MILL EQUIPMENT

Modern . . Efficient
. . Economical

Designed by experienced mill men who have a fore-knowledge of the newest mill practice.

LEWIS FOUNDRY & MACHINE CO.
PITTSBURGH, PA.



A GREATER REPUBLIC STEEL CORPORATION

accepts the challenge of industry . . .

With assets increased by more than $40,000,000, with greatly enlarged reserves of northern iron ores, with advantageous terminal facilities on the Great Lakes and strategically located additional plants, a greater Republic Steel Corporation accepts the challenge of every steel-using industry.

The merger of Corrigan-McKinney Steel Company and Newton Steel Company with Republic Steel Corporation is one of far-reaching significance. Corrigan-McKinney Steel Company brings to Republic tremendously increased facilities for the production of high grade pig iron and steel. Newton Steel Company has long been an important source of supply for quality sheets.

Even before the acquisition of these companies, Republic was the world's largest producer of alloy steels, including the famous Agathon line, ENDURO perfected stainless steels and the new Republic Double Strength high tensile steels that are lightening the weight of nearly every type of transportation unit. Republic has been the sole maker of rust-resisting Toncan Iron for more than 27 years—the pioneer in the development of electric resistance welded pipe—the maker of Sil-con low-loss electrical sheets and coiled strip.

In addition to making these trade-marked products, Republic continues to occupy an important place among the producers of high quality plain carbon steels in practically all commercial shapes.

A greater Republic Steel Corporation accepts the challenge of industry—looks optimistically to the future—keeps pace with the increasing demand for ever better steels—steels lighter in weight—steels of greater strength—steels more resistant to corrosion and high temperatures—steels that strike a new note in beauty—steels more dependable, longer lasting and more economical.

Republic Steel
CORPORATION
GENERAL OFFICES · · · YOUNGSTOWN, OHIO

ALLOY AND CARBON STEELS
TONCAN IRON • STAINLESS STEEL
PIPE AND TUBULAR PRODUCTS
BARS AND SHAPES • PLATES
HOT AND COLD ROLLED STRIP
HOT ROLLED, COLD ROLLED
AND SPECIAL FINISH SHEETS
TIN PLATE • WIRE PRODUCTS
NUTS, BOLTS, RIVETS, ETC.
DIE ROLLED PRODUCTS

Vol. 97, No. 19, Nov. 4, 1935, issue of STEEL, published weekly at Cleveland, O. Entered as second class matter at the postoffice, Cleveland, O., under the act of March 3, 1879. Subscription price U. S. one year, $4.00; two years, $6.00; single copy (current issues) 25c; Canada, one year, $6.60; two years, $11.20. Great Britain and other foreign countries, one year £2

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

EDITORIAL STAFF

E. L. SHANER, *Editor*
E. C. BARRINGER, *Managing Editor*
E. C. KREUTZBERG, *Engineering Editor*

ASSOCIATE EDITORS

A. J. HAIN — E. F. ROSS
G. H. MANLOVE — J. D. KNOX
A. H. ALLEN

New York — B. K. PRICE—L. E. BROWNE
Pittsburgh — E. A. FRANCE JR.
Chicago — W. G. GUDE
Washington — L. M. LAMM
London — VINCENT DELPORT

Published by
PENTON PUBLISHING CO.
PENTON BUILDING
CLEVELAND, O.

JOHN A. PENTON . *Chairman of Board*
C. J. STARK . *President and Treasurer*
J. D. PEASE . *Executive Vice President*
F. V. COLE . *Vice President and Secretary*
GEORGE O. HAYS . . *Vice President*
E. L. SHANER . . . . *Vice President*

BUSINESS STAFF

GEORGE O. HAYS, *Business Manager*
JOHN HENRY, *Advertising Manager*
R. T. MASON, *Circulation Manager*

New York — E. W. KREUTZBERG, J. F. AHRENS, J. W. ZUBER
Pittsburgh — S. H. JASPER
Chicago — L. C. PELOTT
Cleveland — R. C. JAENKE

Contents . . November 4, 1935

Volume 97 • Number 19

AS THE EDITOR VIEWS THE NEWS 21
Steel Profits Up in Third Quarter, Averaging 95 Cents a ton 22
Machine Tool Builders Stress Sales, Training, Publicity 23
Tower Sees Steel House as Aid to Warehouse..... 25

Production 26
Transportation 26
Meetings 26
Labor 26
They Say 31
Steel in the News 31

October Iron Output Highest in 16 Months..... 27
Mirrors of Motordom 28
Windows of Washington 30
Industrial Men in the Day's News 32
Obituaries 34

EDITORIAL—Start Training Key Men Now! 35
THE BUSINESS TREND 36

ENGINEERING DEVELOPMENTS:

Die Castings 38
Modern Gas Producer 43
Alloy Iron Castings 46
Power Drives 47
Methods and Materials 48
Central Washing Chamber 48
Stainless Steel Stylist 50
Electric Water Heater 52
A.S.M.E. Meeting Program 52
Robert E. Kinkead 53
Forum on Modernization 55
Open-Hearth Design-XXIII 58
Improving Rail Structure 64
Tata Mill Production 64
Progress in Steelmaking ..100
New Equipment 101

ACETYLENE ASSOCIATION SECTION 67-98
MARKET REPORTS AND PRICES 105-127
CONSTRUCTION AND ENTERPRISE 127
ADVERTISERS' INDEX 146

BRANCH OFFICES:

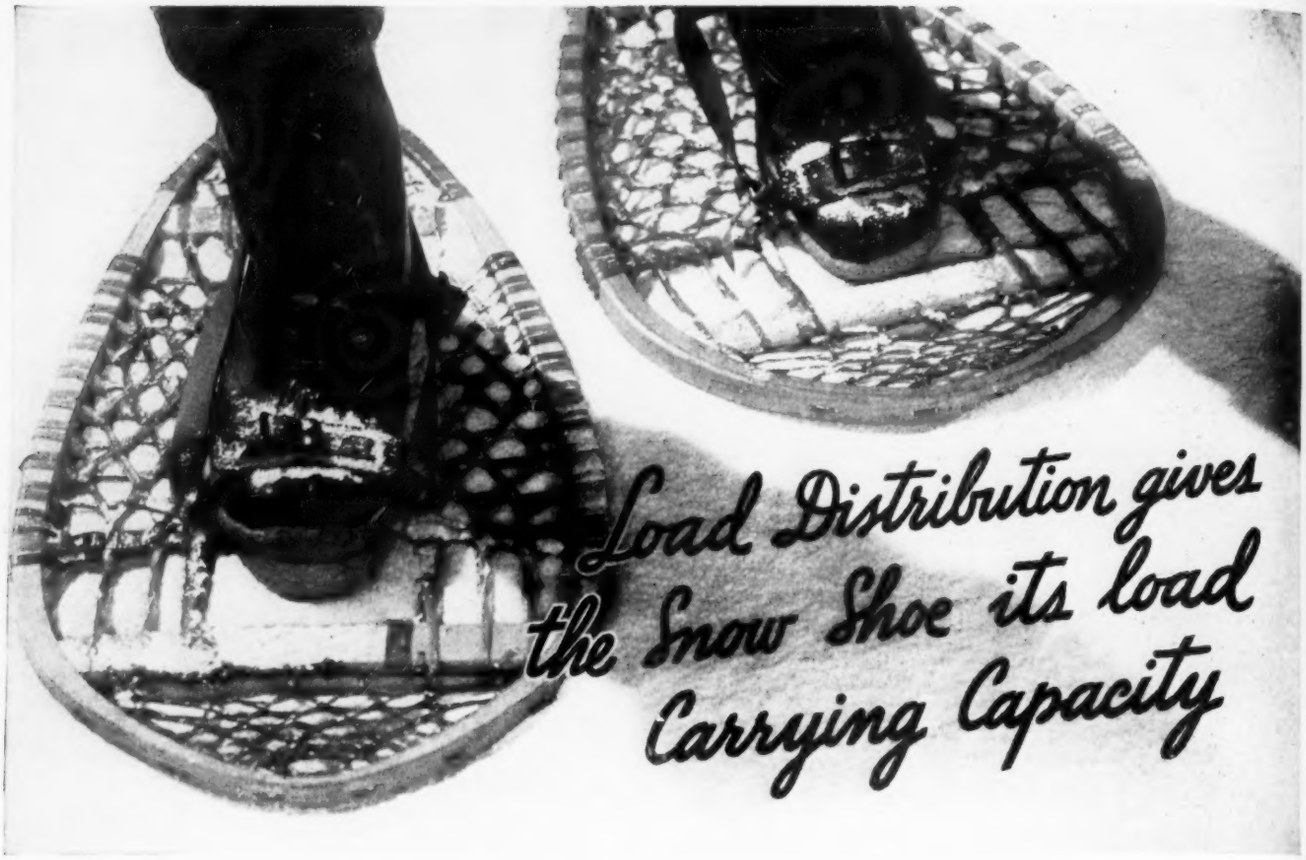
New York . . . . . **220 Broadway**
Chicago . . . . **Peoples Gas Building**
Pittsburgh . . . **1650 Koppers Building**
San Francisco . . . . **2413 Milvia St. Berkeley, Calif., Tel. Berkeley 7354W**
Washington . . . **National Press Building**
Cincinnati . . . **418-420 Sinton Hotel**
London . . . . . **Caxton House Westminster, S. W. 1**
Berlin . . **Berlin, N. W. 40, Roonstrasse 10**

Member Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers Association.

Published every Monday. Subscription in the United States, Cuba and Mexico, one year $4, two years $6; in Canada, one year $6.60, two years $11.20; in Great Britain and European countries, one year £2.

Entered as second class matter at postoffice at Cleveland under the Act of March 3, 1879.

Copyright 1935 by Penton Publishing Co.



THE SAME PRINCIPLE GIVES CONE WORM GEARING ITS AMAZING ADVANTAGES

CONE Worm Gearing introduces AREA CONTACT into the gear field—30 times as much tooth area contact at a given time as the ordinary straight worm.

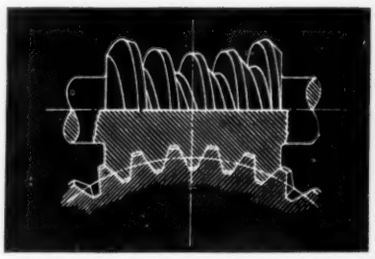
The consequent distribution of pressure results in less wear, less heat generation, greater smoothness, silence and increased load carrying capacity. Ideal lubrication is automatically obtained, as well as proved efficiencies as high as 99.34%—the highest ever recorded.

Forty million miles in 3000 cars without a single failure or replacement due to wear—continuous operation at 30,000 R. P. M.—intermittent extreme load operation at four revolutions per hour—are examples of standard conditions under which Cone Worm Gearing is operating.

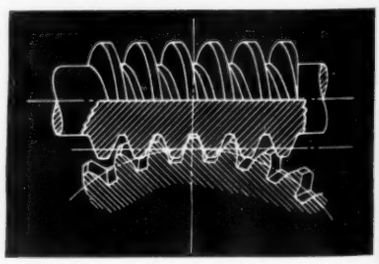
The whole secret of the success of Cone Gearing lies in the novel and exclusive manufacturing process which has placed it on a production basis.

Available in sizes from one inch to several feet in diameter—in ratios ranging from 1 to 1 to 150 to 1—and in quantities up to a million or more.

Literature, quotations or information on manufacturing licenses on request.



TYPE OF CONTACT CONE GEARING



TYPE OF CONTACT CONVENTIONAL WORMS

Canadian Licensees: Dominion Engineering Works Ltd., Montreal, Canada.

MICHIGAN TOOL COMPANY • DETROIT, MICHIGAN

As the Editor Views the News

IF YOU would know the trend of the thinking of industrial executives, study the tenor of convention programs! A resume of the fare of oratory offered during the present season of annual meetings will show that industry is changing its perspective. Whereas a year ago, convention speakers were discussing ways and means of meeting the challenge of anti-industrial influences, today they are talking about production, sales, employe training, etc. Then they were thinking of defense against current problems; now they are considering offensive measures for the future. The change in attitude is gratifying, and it may prove to be highly significant.

• • •

Industry Lifts Eyes to Future

The change from passive resistance to aggressive action was reflected in every meeting held last week. Moreover there were signs that groups assembled in widely scattered convention halls are seeking similar, if not identical, objectives. Throughout their deliberations, one finds the thread of common determination to break down the barrier of procrastination in the purchase of durable goods, to explore new markets more thoroughly and to improve selling and distribution all along the line. These objectives were apparent in the remarks of Walter S. Tower at Atlantic City and in the address of Charles R. Hook to investment bankers at White Sulphur Springs.

• • •

A Suggestion for Distribution

It is significant that in both of these addresses much emphasis is placed upon the desirability of solving the problems incidental to the widespread use of steel in houses. These speakers are in agreement with many others as to the importance of this market to the metalworking industries. Mr. Tower introduces a somewhat new thought in regard to the mechanics of distributing steel to this new market. It is his opinion (p. 25) the "distributor of steel products (warehouse) appears to offer a more logical channel for distribution of the prefabricated house or steel for houses than either the steel fabricator or the general building supply material yard." The question of distribution is extremely important, but it cannot be worked out independently of the allied problems of coordination, promotion, finance, etc. There is a big, overall job to be done!

• • •

Train More, Better Men

Meeting in Hot Springs, Va., machine tool builders set their course toward a three-way program (p. 23) of more intensive selling, a continuation of educational publicity and a resumption and expansion of employe training. The eyes of this industry are focused upon that time in the future when more and better trained men will be required if an acute shortage of skilled labor is to be averted. The problem of insuring an adequate supply of competents for the noncommissioned and other key posts in industry (p. 35) is one that should be receiving the active attention of every employer today. This is a matter that cannot be put off much longer. The need for more and better men already is apparent.

• • •

New Steels Find Outlets

A hint as to how the new low-alloy, high-tensile, corrosion resistant steels will find their way into many types of industrial equipment where ordinary carbon steel has been used in the past is afforded by the development of a newly designed gas producer (p. 43) in which these steels, fabricated by welding, are used extensively . . . . The ever widening range of new applications for steel also is emphasized in the manufacture of stainless steel table service (p. 50) for the Burlington's Zephyr trains, and in the installation in the White House at Washington of a "thermotainer" (p. 31) fabricated from stainless steel . . . . Slowly, but surely, industry is finding opportunities in new markets. That fact should stimulate renewed, enlightened merchandising.

E. L. Shaner

Steel Profits Up for Third Quarter, Averaging 95c a Ton

IRON and steel producers made a profit of $7,600,000 in the third quarter compared with a loss of $24,700,000 in the corresponding quarter of 1934, while in the first nine months of 1935 they have earned $26,900,000, against a deficit of $10,100,000 a year ago.

This showing for the entire industry is indicated by reports from the first 17 producing and finishing interests to issue statements—14 of these 17 being integrated and representing 82 per cent of the total steel ingot capacity of the country.

Loss from Second Quarter

Earnings for the third quarter are off about one-third from the second quarter, this being due to an increase in the proportion of heavy products shipped during the quarter, which appears to be due to the fact that the automotive industry just now is emerging from the model change period.

Only four of these 17 interests were in the red in the third quarter, whereas a year ago only two were in the black. Without exception the position of all 17 has improved compared with a year ago—that is, losses have been converted into profits, or reduced.

In the third quarter, ingot production totaled 8,019,385 tons. This indicates that steelmakers made an average of 95 cents per ton. In the third quarter of 1934, when production was 4,139,780 tons, the loss per ton averaged $5.86. On a 9-month basis, the average per-ton profit this year has been $1.12; a year ago the average per-ton loss was 49 cents.

Dividend action indicates that some of these improved earnings is being passed along to shareholders. Inland Steel Co. again declared an extra of 25 cents in addition to the regular 50 cents, payable Dec. 2 to record of Nov. 15. Vanadium-Alloys Steel Co., Pittsburgh, by voting 50 cents payable Dec. 2 to record of Nov. 22, doubled its rate.

Bethlehem Steel Co. will pay $1.75 on its preferred stock Jan. 2 to record of Dec. 6, as it did Oct. 1. The United States Steel Corp is continuing to pay 50 cents a quarter on the preferred. Allegheny Steel Co. has voted 25 cents for common and $1.75 quarterly payment for preferred stockholders.

Consumers Profit More

Encouraging as this showing of producers is, that of consumers surpasses it. Forty-eight important consumers and fabricators of steel, including several warehouse and supply interests, report an aggregate net of $18,370,747 or more than double the profit of $9,079,579 of these same companies a year ago. The 9-month comparison of the identical 48 companies is a profit this year of $64,530,246 against earnings of only $39,048,268 last year.

It should be borne in mind that the steel industry profit statistics at the beginning of this article are the actual figures for reporting companies, carried in the table at the bottom of this page, related to the entire industry. Statistics for the 48 consumers are those in the table on the opposite page combined with those given on page 14 of the Oct. 28 issue of STEEL.

U. S. STEEL STILL IN RED BUT COLOR IS PALER

Although still in the red, the showing of the United States Steel Corp. for the third quarter conformed to the general trend of improvement. Its deficit was $1,305,205, barely one-eighth the loss of $9,826,767 in the third quarter of 1934.

For nine months the net loss of the Corporation was $4,241,499; a year ago the comparable figure was $11,466,000.

In the third quarter the net income of the Corporation, after depletion, depreciation, and obsolescence, was $1,871,710, which interest charges reduced to $644,795. But after deducting overhead expenses of its Lake Superior iron ore and Great Lakes transportation service the deficit was $1,305,205.

One explanation of the Corporation's deficit lies in its labor statistics. In the first nine months of 1935 the number of its employes was 194,222, a decrease of 211 from a year ago. However, the aggregate number of hours worked by employes was 253,159,655, up 7.9 per cent, while its total payroll at $184,361,434 increased nearly twice as much, or 12.5 per cent.

Net working assets of the Corporation on Sept. 30 were $319,742,585,

Third Quarter and Nine-Month Financial Comparisons for Iron and Steel Producers

All Figures Are Profit Except Where Asterisk Denotes a Deficit

	Third Quarter 1935	Second Quarter 1935	Third Quarter 1934	Nine Months 1935	Nine Months 1934	Ingot Capacity Gross Tons
United States Steel Corp.	$1,305,205*	$762,493*	$9,826,767*	$4,241,499*	$11,466,000*	27,341,900
Bethlehem Steel Corp.	701,616	1,800,909	2,400,126*	1,895,227	139,473	8,980,000
Republic Steel Corp.	507,731	922,329	2,998,600*	3,264,295	2,193,158*	5,013,000
Jones & Laughlin Steel Corp	233,914	44,412	1,826,227*	516,463*	2,864,499*	3,671,200
Youngstown Sheet & Tube Co.	574,799	124,758	1,257,371*	103,787	1,668,633*	3,120,000
National Steel Corp.	2,287,763	3,191,169	347,199	8,603,758	4,582,896	2,232,000
Inland Steel Co.	1,810,203	2,392,510	53,476*	6,668,509	3,108,258	2,000,000
Wheeling Steel Corp.	648,597	668,300	930,788*	2,251,468	145,390	1,500,000
Otis Steel Co.	27,367*	435,493	445,402*	1,360,488	563,308	872,000
Allegheny Steel Co.	246,009	176,592	34,133*	746,746	625,701	482,000
Gulf States Steel Co.	58,433	66,662*	205,374*	21,919	13,571*	400,500
Granite City Steel Co.	102,824	177,792	46,314*	415,198	153,931	400,000
Wickwire Spencer Steel Co.	4,655	.....	229,886*	160,269*	297,859*	150,000
Ludlum Steel Co.	118,199	147,014	7,571	518,820	442,436	38,000
Superior Steel Corp.	39,206*	31,289*	157,177*	32,525*	169,119*	.....
Acme Steel Co.	384,479	338,348	13,846*	1,319,817	867,532	.....
Eastern Rolling Mill Co.	68,760*	111,296*	187,651*	175,424*	213,465*	.....
Total	6,238,684	9,447,886	20,258,368*	22,043,852	8,257,379*	56,200,000

an increase of $16,805,097. Current operations of the Corporation are 42 per cent which it expects to maintain during the fourth quarter.

BETHLEHEM HEAD OPTIMISTIC BUT DISTURBED BY POLITICS

Like most integrated producers, Bethlehem Steel Co.'s net in the third quarter—$701,616—was far short of its profit in the second quarter but a decided improvement over the third quarter of 1934, when it lost $2,400,126. However, for the 9-month period it was in a greatly improved position over last year, the net being $1,895,227 this year and only $139,472 last year.

E. G. Grace, president, was moderately optimistic over the future, his outlook being tempered by the uncertainties at Washington. He felt more encouraged over the railroad outlook, declaring that a number of the leading carriers are right up against a car shortage.

NATIONAL'S THIRD QUARTER EARNINGS 6 TIMES YEAR AGO

National Steel Corp. reports net earnings for the third quarter of $2,287,763.49, equal to $1.06 per share, after depreciation, interest and federal taxes. This compares with net earnings of $347,199.30, equal to 16 cents a share, for the third quarter of 1934.

For the nine months of 1935, the company reports net earnings of $8,603,758.69, or $3.99 per share. This figure is after all charges, including a special, nonrecurring interest expense of $242,807.10, amounting to 11 cents per share, incurred in the second quarter, incident to the bond refunding program.

Machine Tool Builders Stress Sales, Training and Publicity

ADDRESSES presented at the thirty-fourth annual convention of the National Machine Tool Builders' association, held Oct. 27 and 28 at the Homestead hotel, Hot Springs, Va., focused attention upon three major objectives.

First is to intensify and improve the selling of machine tools in order to capitalize upon the favorable impression created by the recent Machine Tool show in Cleveland. Second is to continue the publicity campaign which was inaugurated prior to the show. Third is to resume and extend apprentice training and other educational courses in order to meet the threatened shortage of men qualified for key positions and skilled workmanship.

Definite action taken at the convention included the election of new officers and three new directors, as shown in the accompanying list, and the appropriation of $12,000 for continuing the association's publicity campaign.

Sell Industry to Public

In his address as president, Charles J. Stilwell, vice president, Warner & Swasey Co., Cleveland, outlined the activities of the association during the past year. He declared that prior to the time of the Cleveland Machine Tool Show the idea that labor saving machinery is a menace to employment had gained more than a foothold in the public mind. For this reason the publicity campaign conducted in the six months prior to the date of the show was devoted not only to arousing interest in that event but also to promoting the idea that modern, efficient machinery is essential to the nation. In this connection the campaign also attempted to emphasize the importance and size of the machine tool industry.

Turning to the condition of business, Mr. Stilwell said that the Cleveland Machine Tool show demonstrated to the country that the products of the industry are ready for the market. He also declared that the market is ready for salesmanship. He counseled machine tool builders not to be concerned about the slight drop in machine tool orders which has occurred since August. The general direction of business today is upward, he declared, and added that much encouragement is to be found in the upward trend in the fields of agricultural implements, building construction and railroad equipment.

In answer to the question "Can We Produce the Goods?", Mr. Stilwell said that the industry faces a serious shortage of skilled workmen. The only cure, he said is to resume apprentice training and to provide

New Officers and Directors

NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION

President

NORMAN D. MACLEOD

President and General Manager, Abrasive Machine Tool Co., East Providence, R. I.

First Vice President

CLAYTON R. BURT,

President and General Manager, Pratt & Whitney Co., Hartford, Conn.

Second Vice President

HOWARD W. DUNBAR,

Manager, Grinding Machine Division, Norton Co., Worcester, Mass.

Treasurer

HENRY C. PIERLE

Secretary and Sales Manager, R. K. LeBlond Machine Tool Co., Cincinnati

Directors for Three Years

HOWARD W. DUNBAR

GEORGE C. PURDY

President, Greenlee Bros & Co., Rockford, Ill.

W. W. TANGEMAN

Vice President, Cincinnati Milling Machine Co., Cincinnati

How Important Consumers of Iron and Steel Fared

All Figures Are Profits Except Where Asterisk Denotes a Deficit

	Third Quarter		Nine Months	
	1935	1934	1935	1934
National Acme Co., Cleveland	$34,834	*$1,709	$212,262	$148,890
Eureka Vacuum Cleaner Co., Detroit	13,774	49,123	131,891	201,241
Motor Wheel Corp., Lansing, Mich.	40,205	.....	545,582	613,908
Maytag Co., Newton, Iowa	695,832	423,885	1,928,000	1,470,450
Gabriel Co., Cleveland	*11,504	1,003	*45,409	*29,294
National Cash Register Co., Dayton, O.	295,841	226,804	993,754	1,229,751
Briggs & Stratton Corp., Milwaukee	242,996	81,859	919,996	541,941
Borg-Warner Corp., Chicago	1,201,676	570,724	4,213,008	2,521,252
S. R. Dresser Mfg. Co., Bradford, Pa.	.....	.....	96,457	82,048
Sullivan Machinery Co., Chicago	*31,663	*43,185	*95,998	*196,675
Spicer Mfg. Corp., Toledo, O.	80,814	266,608	330,263	563,824
General Railway Signal Co., Rochester N. Y.	282,035	*83,623	511,178	*360,713
Stewart-Warner Corp., Chicago	.....	.....	1,329,423	565,782
Kelsey-Hayes Wheel Co., Detroit	*206,298	*86,794	1,437,225	379,161
Link-Belt Co., Chicago	326,434	194,667	858,927	573,406
Square D Co., Detroit	.....	.....	448,246	280,853
Savage Arms Corp., New York	76,674	54,175	27,893	*10,854
Midland Steel Products Co., Cleveland	89,810	80,744	743,310	374,395
L. A. Young Spring & Wire Co., Detroit	135,251	51,006	1,202,836	718,556
Pittsburgh Screw & Bolt Corp., Pittsburgh	7,669	*7,023	*76,263	335,893
Total, 20 companies	3,274,380	1,778,294	15,712,581	10,003,815
Total of 28 companies reported last week	15,096,367	7,301,285	48,817,665	29,044,453
Grand total 48 companies	18,370,747	9,079,579	64,530,246	39,048,268

New President, N.M.T.B.A.

Norman D. MacLeod

adequate methods for training machine operators, foremen, inspectors and other specialized workers. He also cautioned machine tool builders to look into the obsolescence of equipment in their own plants. In conclusion he emphasized the necessity of adopting more aggressive sales efforts to capitalize upon the favorable impression created by the Cleveland Machine Tool show.

Fight Dangerous Legislation

Herman H. Lind, in his report as general manager, reminded his listeners that the threat of ill-advised legislation is not past. The Black-Connery 30-hour week bills probably will be presented in the next session of congress and the obnoxious Walsh bill again will come up for action. It is important that industry continue to fight against these and other dangerous bills. Mr. Lind contended that one of the most effective ways to combat this threat is to give representatives and senators a clearer idea of industry's problems. To accomplish this, Mr. Lind urged machine tool builders to invite their congressmen and senators to their plants. He pointed out that ordinarily these congressmen, most of whom are lawyers, get many of their ideas from uplifters who never have been identified with industry and who have no practical knowledge of its problems. Many of these uplifters have distorted ideas about industry. Mr. Lind declared that congressmen and senators when visiting a plant can see for themselves conditions which contradict the impression which they received from uplifters. Such visits, he contends, go a long way toward helping members of congress to understand industry.

W. P. Kirk, vice president, Pratt & Whitney Co., Hartford, Conn., presented the report of the exposition committee. This showed that more than 60,000 visitors registered at the Cleveland show. The 238 exhibitors occupied 123,511 square feet of floor space. Of this number of exhibitors, 118 were member companies of the association. They occupied 80 per cent of the total floor space. Their booths ranged in size from 200 to 3000 square feet. The member companies of the association exhibited more than 200 different types of machine tools.

Prospective buyers came to the show from 25 foreign countries and from 1250 cities in 48 states of the United States. Reports of the show appeared in 64 magazines and in over 1000 newspapers.

By unanimous vote the convention discharged the exposition committee and expressed deep appreciation for the exceptional manner in which its members had performed their duties. Members of the committee, in addition to W. P. Kirk, its chairman, were Geoerge L. Erwin Jr., sales manager, Kearney & Trecker Corp., Milwaukee; Norman D. MacLeod, president and general manager, Abrasive Machine Tool Co., East Providence, R. I.; J. G. Hey, vice president and general manager, Avey Drilling Machine Co., Cincinnati; and W. E. Whipp, president and general manager, Monarch Machine Tool Co., Sidney, O.

R. H. Dick, president, Barrington Associates Inc., New York, in an address entitled, "Marketing Learns Lessons from Production," emphasized the need of sales-minded management in the machine tool business. He declared that the history of the machine tool industry shows that it is handicapped in selling by seven "bad" conditions:

1. It is a "feast or pauper" industry—a condition which makes it difficult to plan a long-range program.
2. Management, having developed from the technical side, is not sales-minded.
3. The buying function is stronger than the selling function.
4. Few fundamental changes in design have been introduced; this throws an unduly heavy burden on selling.
5. Most manufacturers who buy machine tools do not lay aside cash for depreciation for a reserve fund to finance new equipment purchases.
6. Machine tools are too well made; they last too long.
7. So many types of machine tools compete with one another.

Three on Credit Side

On the other side of the picture, Mr. Dick cited three "good" points for the industry:

1. Its products are basic for production and maintenance.
2. Obsolete tools will have to be replaced sometime.
3. The industry is one of the first to be called upon in time of an emergency or when a new product or a new manufacturing industry is created.

According to Mr. Dick, the handicaps can be overcome by more aggressive group and individual effort to improve selling. This means that general management must acquire sales-mindedness and that sales management must be accorded the full support of general management. Also, three basic steps in selling must be learned and put into practice.

The first step is long-range plan-

(*Please turn to Page* 104)

Machine Tool Builders Elect Vice Presidents

Clayton R. Burt
Named First Vice President

Howard W. Dunbar
Elected Second Vice President

Tower Sees Steel House as Aid to Warehousing Problem

DEVELOPMENT of the use of steel in houses, including the prefabricated house, seems likely to be of great benefit to distributors of steel products and fill in whatever losses may be met in that industry by changes in method of steel distribution through mill-owned warehouses and specialization in steels.

This is the conclusion voiced by Walter S. Tower, executive secretary of the American Iron and Steel Institute, New York, before the forty-first annual convention of the National Wholesale Hardware association at Atlantic City, N. J.

On this point Mr. Tower said:

"In this discussion of the relations to which both producer and distributor will have to give consideration, I should like to refer to the much-discussed question of the use of steel in houses, including the prefabricated house, as it is sometimes called.

Design, Distribution Are Problems

"Although it is not yet a subject on which there is common agreement, it seems to me from the amount of interest in the subject and the effort which is being put into promoting the idea of steel in private dwellings, and the fundamental merits of the case, that the steel house or prefabricated house is bound ultimately to win general favor in this country. Whether in two years or in ten, I prefer not to predict.

"Before that position can be fully realized, however, it probably will be necessary to make further progress in the matter of design. There is also unquestionably a great deal still to be done in the field of education among prospective home owners, as well as among architects and building contractors. But perhaps most of all it is not yet clear that anyone has an entirely satisfactory answer to the problem of distribution.

"After all, there is little to be gained by perfection of design or by accomplishment of necessary education, if the proper channels have not been satisfactorily worked out through which to make steel for private dwellings or prefabricated houses readily available wherever there may be a demand.

"Everyone is familiar with the fact that a host of lumber yards or building supply dealers is scattered throughout the country. It may be that those dealers in lumber and other building materials, because of established connections with architects and contractors, could take on, as an additional line, steel for use in private dwellings or the materials for prefabricated houses. That does not appeal to me, however, as providing the right answer.

"There is also the group of so-called steel fabricators who, for somewhat similar reasons, might be thought of as possible avenues for distributing steel for houses. At the most, however, there are not more than four or five hundred such fabricators, including even the smallest, a number probably totally inadequate in their locations and range of activities, to perform satisfactorily the service of distribution for general use of steel in dwellings.

"One may ask, therefore, whether producers must face the question of creating new channels of distribution or whether the distributors which are now handling steel products may not find in that prospect an important source of future business and the basis for new relations with the producers of steel of those descriptions which will enter into house construction. For various reasons, the distributor of steel products appears to offer a more logical channel for distribution of the prefabricated house or steel for houses, than either the steel fabricator or the general building supply material yard.

"One of the obvious reasons is the experience which he has had in dealing with steel products generally. Whether that will be the answer to the question of steel house distribution seems to me to depend largely on whether the distributors of steel products are alert enough to make sure that such shall be the case.

"On the whole it appears that there are some forces at work which taken by themselves would tend to weaken the position of the distributor, or at least to make more difficult, his problem of handling some classes of steel products. There are on the other side, prospects which may more than compensate the distributor for any losses that may be realized in the old relations. The real question is whether both producer and distributor will be ready to take full advantage of the opportunity whenever it comes."

Among the forces tending to weaken the position of the steel distributor and make his position more difficult Mr. Tower referred to the greater flexibility of mill rolling schedules that allow earlier production than under the old method of infrequent roll changes and also the accelerated methods of delivery by rail or truck. These result in lessened need for the distributor's services on the part of both producer and consumer. This is modified by the willingness or reluctance of producers to handle directly such quantities as may be had from the distributor's stock.

Larger Capital Is Required

Discussing the basis of compensation for the service rendered by the distributor the speaker, while recognizing the controversial character of the "jobber's deduction" question, gave as his personal opinion that warehousemen would do themselves a lasting service by urging on producers complete elimination of this custom. This opinion is based on the belief that assurance that competitors cannot buy more cheaply would be a stabilizing influence.

Tendencies operating to add difficulty to the distributor's task include the specialization of quality and chemical analysis of steels to meet requirements of consumers; special grades of alloy steels, including corrosion-resisting and stainless steels; production of steel sheets in coils and other changes in form.

As the development of special steels of the alloy and stainless types proceeds, Mr. Tower said, the distributor will have to face the problem of capital required for carrying an adequate stock of steels for which the unit price may be many times that of the common steel formerly the only grade he carried. Whether the distributor will find himself able to maintain his relations or the producer must be prepared to perform the service himself is a matter for careful adjustment.

The present tendency toward control and operation of warehouses by steel producers appears to the speaker to offer more reasons to believe that it will be more helpful than harmful to the distributing trade generally. In any event few producers have sufficient range of products to make warehousing a practicable feature.

Problems of Distribution

THE steel distributor has a logical place in the selling mechanism and serves both producer and consumer.

More flexible mill schedules and better delivery service tends to limit the need for the distributor.

Sales for direct mill shipment are not part of the warehouse service but rather an agency.

Established distributors would be doing themselves a service by urging elimination of the "jobber's deduction"; consignment stocks are undesirable factor.

Specialization in analysis and forms of steel make difficult maintenance of warehouse assortments and add to capital requirements.

The steel distributor appears the logical channel for handling the prefabricated house or steel for houses, rather than the fabricator or general building supply yard.

Production

STEELMAKING forged ahead 2 points last week to 54½ per cent, highest point since the first two weeks of February this year. Increases were registered in all districts, with the exception of Pittsburgh and Birmingham which held steady. Tentative schedules indicate a slight recession this week, with both Pittsburgh and Youngstown slowing down. Further details follow:

Youngstown—Gained 1 point last week to 63 per cent, and the rate is expected to stay slightly above 60 per cent at this week's start.

Chicago—Rose to 55 per cent, recovering one of the six points lost in operations during the preceding three weeks. Two more blast furnaces have been lighted in this district, bringing the number of active stacks to 19 out of 41. The Zenith furnace at Duluth is scheduled to be lighted this week. A steady ingot rate is in prospect for this week.

Cleveland-Lorain—Up 8 points to 72 per cent, all active steelworks lighting one more open hearth each. Republic Steel Corp.'s Corrigan-McKinney division operated ten, Otis Steel Co. eight, and National Tube Co., Lorain, ten.

Birmingham—Held at 58½ per cent last week, with 13 open hearths continuing in production. Indications point to a continuance of this rate.

Buffalo—Gained 2 points to 42 per cent, with 16 open hearths on active schedule, and this rate will probably hold for this week.

Wheeling—Up 6 points to 84 per cent last week, with 31 out of 37 open-hearth furnaces operating, compared with 29 on a week ago and 30 on two weeks ago.

Detroit—Up 6 points to 94 per cent, with one producer operating all eight furnaces and the second, eight out of nine.

Pittsburgh—Unchanged at 47 per cent, the rates of individual producers continuing virtually the same as two weeks ago. The leading independent, which is now operating at 60 per cent, expects to reduce its operations to 55 per cent for this week, bringing the rate down 3 points to 44 per cent.

Twenty-six out of 60 steelworks blast furnaces are operating, 11 of these being on for Carnegie-Illinois Steel Corp.; 8 for Jones & Laughlin Steel Corp.; 3 for Bethlehem Steel Co., and 1 each for Pittsburgh Crucible Steel Co., Pittsburgh Steel Co., National Tube Co., and American Steel & Wire Co.

Central eastern seaboard — Increased fractionally to 38½ per cent last week. An eastern plate maker added one furnace and another is scheduled to add one this week. Finished steel consumption shows further expansion, with a somewhat more substantial increase in steelmaking operations likely within the next two or three weeks.

New England—Up 2 points to 70 per cent. This rate will be bettered this week, one steel works going to 100 per cent operations.

Steelmaking Operations

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended Nov. 2	Change	Same week 1934	Same week 1933
Pittsburgh	47	None	19	25
Chicago	55	+ 1	30	31
Eastern Pa.	38½	+ ½	20½	19
Youngstown	63	+ 1	30	32
Wheeling	84	+ 6	31	38
Cleveland	72	+ 8	38	36
Buffalo	42	+ 2	26	21
Birmingham	58½	None	25	25
New England	70	+ 2	30	80
Detroit	94	+ 6	59	55
Average	54½	+ 2	27	25

Transportation

HONORING its new president, Carnegie-Illinois Steel Corp., Pittsburgh, has renamed one of its Ohio river steamers the B. F. FAIRLESS. The steamer was sent out on its first tow Oct. 31, when it left Pittsburgh with several barge loads of steel designated for points south as far as New Orleans.

11 BARGES IN J & L TOW

Jones & Laughlin Steel Corp., Pittsburgh, dispatched the steamer VESTA on Oct. 28 with a tow of 11 barges loaded with steel products for delivery to Memphis, Tenn., and New Orleans.

Meetings

FOUNDRY Equipment Manufacturers association will present to the northeastern Ohio chapter of American Foundrymen's association at its Nov. 14 meeting at the Cleveland club, Cleveland, an outline of new developments in foundry equipment. Dinner at 6:15 p.m. will be followed by the discussion.

PLAN MEETING IN DETROIT

At a meeting of the Open-Hearth Control Committee of the American Institute of Mining and Metallurgical Engineers held in Chicago recently during the Metal Congress, it was decided to hold the Spring meeting of the Open-Hearth Committee in Detroit, April 16-17.

Labor

SEPTEMBER payrolls and average weekly earnings of employes in the iron and steel industry were nearly 50 per cent greater than September, 1934, according to the American Iron and Steel institute. Except for number of employes, September figures are slightly lower than those of August, due to the fact that September was a shorter month. A comparison of September this year with last follows:

	September 1935	September 1934
Total number of employes	424,779	381,828
Total payrolls	$45,472,741	$29,142,892
Hours per week per wage earner	34.0	22.6
Av. hourly earnings, wage earners	65.4c	64.0c
Ingot production (Gross Tons)	2,829,835	1,268,977

SHEET WAGES UNCHANGED

Wage rates in sheet and tin plate mills having contracts with the Amalgamated Association of Iron, Steel and Tin Workers will be unchanged for November and December. The average selling price of Nos. 26, 27 and 28 gage plain sheets in September and October was 2.65c, unchanged from the preceding bimonthly period. The card rate is 15 per cent above base rates.

BAR IRON WAGE RATE STANDS

Wage rates in bar iron mills having contracts with the Amalgamated Association of Iron, Steel, and Tin Workers will remain unchanged through November and December, no change having occurred in average sales prices during September and October. The card rate for the next bimonthly period is 2 cents on boiling, or puddling, bar, and 12-inch mills, and 2.10 cents on guide and 10-inch mills.

CITES ROLLWAY BEARING CO.

National labor relations board reports that the Rollway Bearing Co., Syracuse, N. Y., has been cited by its regional director at Buffalo for violation of the Wagner-Connery act. The complaint alleges the discriminatory discharge of six employes for known union activity and refusal of the company since July 1 to bargain collectively.

ARMSTRONG RAISES WAGES

Armstrong Cork Co., Lancaster, Pa., has granted a 5 per cent wage increase effective Nov. 3, and a retroactive salary adjustment in an amount equivalent to 5 per cent of the 1935 compensation of each salaried employe in the service of the company on Dec. 24, when payment will be made. A plan of unemployment benefits also has been adopted.

October Iron Output Best in 16 Months; 10 Stacks Resume

WITH the resumption of ten blast furnaces in October, production of coke pig iron in the United States during the month was lifted to a level which was the highest since early summer of last year. This was revealed in STEEL'S compilation of reports received largely by telegraph and involving producer's estimates for the last day or two of the month. Substantial increases were made in total and average daily output, and the 114 active furnaces closely approached the highest number for 1934.

Average daily production in October was 63,858 gross tons, a gain of 4849 tons, or 8.2 per cent over the September rate of 59,009 tons. This was the best daily rate since June, 1934, with 64,563 tons. The rate in October, a year ago, was 30,689 tons.

Total production was 1,979,609 tons, which, compared with the 1,770,259 tons of the preceding month, was an increase of 209,350 tons, or 11.8 per cent. This output was the highest since May, 1934, with 2,057,471 tons, and compares with the 951,353-ton production in October a year ago.

For the ten months of the current year, production has aggregated 16,859,924 tons, and represents an increase of 2,868,157 tons, or 20.5 per cent, over the 13,991,767 tons made in the corresponding period of 1934. The 10-month total for 1933 was 10,945,831 tons.

Relating production to capacity, the operating rate for October was 45.8 per cent, against 42.5 in September and 22.1 per cent in October last year. This rate was the highest for any month since June, 1934, which recorded 46.3 per cent.

Active stacks on Oct. 31 totaled 114, against 104 on Sept. 30, 98 on Aug. 31, and 65 on Oct. 31, 1934. The 114 total was the best for any month since May, one year ago, with 117, a total which stands as the highest since September, 1930. During the month, 8 steelworks furnaces and 2 merchant furnaces were returned to production. No furnaces of either classification were blown out or banked.

Blast furnaces resuming in October were: In Ohio: Youngstown No. 3, Republic Steel Corp.; Ohio No. 4, Carnegie Steel Co.; Lorain No. 1, National Tube Co. In Pennsylvania: Duquesne No. 5, Carnegie Steel Co.; one Eliza, Jones & Laughlin Steel Corp. In New York: Buffalo No. 1, Republic Steel Corp. In Alabama: One Woodward, Woodward Iron Co. In Illinois: South Works Old No. 3, Carnegie-Illinois Steel Co.; Iroquois No. 3, Youngstown Sheet & Tube Co. In Indiana: Gary No. 8, Carnegie-Illinois Steel Co.

With the dismantling of the Cherry Valley furnace at Leetonia, O., as announced in STEEL, Oct. 28, page 18, the total number of potential stacks in the country is reduced from 270 to 269. The Cherry Valley unit, last operated by the Davison Coke & Iron Co., Pittsburgh, had an annual capacity of 140,000 tons of iron.

MONTHLY IRON PRODUCTION

Gross Tons

	1935	1934	1933
Jan.	1,478,443	1,225,643	568,785
Feb.	1,614,905	1,270,792	553,067
Mar.	1,770,990	1,625,588	542,013
Apr.	1,671,556	1,736,217	623,606
May	1,735,577	2,057,471	892,326
June	1,558,463	1,936,897	1,264,953
July	1,520,340	1,228,544	1,801,345
Aug.	1,759,782	1,960,187	1,833,265
Sept.	1,770,259	899,075	1,507,931
Oct.	1,979,609	951,353	1,358,540
10 mo.	16,859,924	13,991,767	10,945,831
Nov.	.....	957,906	1,083,740
Dec.	.....	1,028,006	1,192,136
Total	.....	15,977,679	13,221,707

AVERAGE DAILY PRODUCTION

Gross Tons

	1935	1934	1933	1932
Jan.	47,692	39,537	18,348	31,336
Feb.	57,675	45,385	19,752	33,122
Mar.	57,120	52,438	17,484	31,194
Apr.	55,719	57,873	20,786	28,524
May	55,986	66,370	28,784	25,282
June	51,949	64,563	42,165	20,867
July	49,043	39,630	58,108	18,394
Aug.	56,767	34,199	59,137	17,035
Sept.	59,009	29,969	50,264	19,788
Oct.	63,858	30,689	43,824	20,795
Nov.	.....	31,930	36,124	20,858
Dec.	.....	33,161	38,456	17,650
Ave.	55,160	43,774	36,223	23,699

OCTOBER IRON PRODUCTION

	No. in blast last day of Oct.	Sept.	Total tonnage Merchant	Nonmerchant
Ohio	29	26	97,158	401,602
Penna.	36	34	80,270*	505,415*
Alabama	7	6	64,773	38,812
Illinois	10	8	42,491	144,591
New York	9	8	49,700	103,313
Colorado	1	1		
Indiana	9	8	3,542*	285,663
Maryland	3	3		
Virginia	1	1		
Kentucky	1	1		
Mass.	0	0		
Tennessee	0	0		
Utah	1	1	5,588	156,691
West Va.	3	3		
Michigan	4	4		
Minnesota	0	0		
Missouri	0	0		
Total	114	104	343,522*	1,636,087*

*Includes ferro and spiegeleisen.

Lincoln and Meanor Form Lakeside Welding Co.

The Lakeside Welding Co., 3005 East Fifty-fifth street, Cleveland, has been organized by John G. Lincoln and Homer Meanor to conduct a commercial weldery.

Both Messrs. Lincoln and Meanor have had a broad background of experience in welding and redesign work. Mr. Lincoln, who is the son of John C. Lincoln, chairman of the Lincoln Electric Co., spent a number of years in research and development work. Mr. Meanor also was with the Lincoln Electric Co., where he developed designs for welding in the engineering department. Just prior to the formation of the new Lakeside company he was connected with the Contract Welding Co., Cleveland.

With its own stress relieving equipment, the new Lakeside shop will handle commercial welding work of all kinds, including machine parts and bases, as well as contract welding in the tank building, railroad, and bridge fields.

RATE OF OPERATION

(Relation of Production to Capacity)

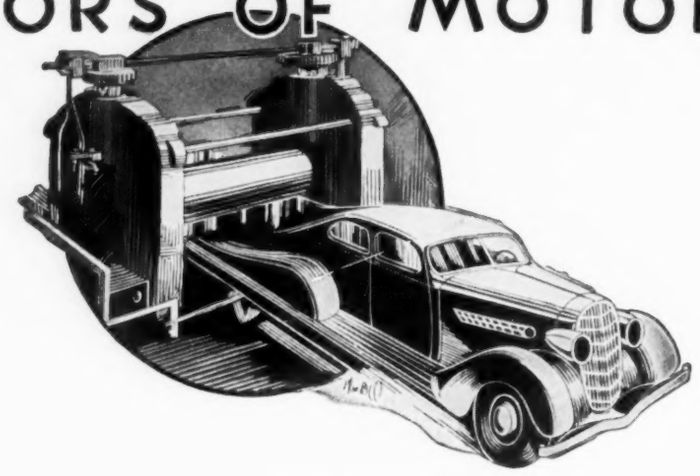
Jan.	34.2	28.3	13.3	22.1
Feb.	41.4	32.5	14.3	23.4
Mar.	41.0	37.5	12.7	22.0
Apr.	40.0	41.4	15.1	20.2
May	40.2	47.5	20.9	17.9
June	37.2	46.3	30.6	14.7
July	35.2	28.4	42.4	13.0
Aug.	40.7	24.5	42.8	12.0
Sept.	42.5	21.5	36.4	14.0
Oct.	45.8	22.1	31.8	14.7
Nov.	.....	22.8	26.2	14.7
Dec.	.....	23.7	27.9	12.5

[1]Based on capacity of 50,845,741 gross tons, Dec. 31, 1934; [2]capacity of 50,975,561 tons, Dec. 31, 1933; [3]capacity of 50,313,975 tons, Dec. 31, 1932; [4]capacity of 51,598,175 tons, Dec. 31, 1931. Capacities by American Iron and Steel institute.

OBTAINS DRAWBACK ON BLADES

Drawback allowance has been granted by the treasury department on safety razor blades, and hardened, tempered and perforated razor blade steel strips in coils manufactured by the Ardell Razor Blade Corp. of New York, with the use of cold-rolled soft steel strips imported in coils.

MIRRORS OF MOTORDOM



DETROIT

TO ALMOST every outsider, the Ford-Lincoln nuptials of the early 20's may have had the best wishes of both sides of the house for a *sympatica* future, but since then, somehow, the constituents in the merger never got down to an arm-in-arm relationship.

Probably so, because over the intervening years, policy developed to price and style Lincoln and Ford as far apart as the poles. Because Colonel Leland deeded over his proud daughter, Lincoln, to the house of Ford, it failed to alter Henry Ford's unwavering belief in "Cheap transportation is what the public wants." So, under the same roof, each car stood at arms length.

Zephyr Changes Picture

While thousands of Fords were being produced to each Lincoln, one can almost see Henry Ford himself looking on his Lincoln division as something like an expensive toy. Detroit had come to accept the sharp contrast between General Motors' spread-eagling the motor field in all prices and Ford's wide price gap between its two cars.

That is, until 1936. Since Edsel Ford returned from California a short time ago and put the final O.K. on the low-priced Lincoln, known commercially as the "Lincoln-Zephyr," Ford has at last entered a model in the medium-priced field.

Last Saturday at Hotel Astor, New York, the public had its first official view of the car that has been planned, theorized, designed, and redesigned for the last 18 months. Ford and Lincoln have joined hands. The Lincoln-Zephr clearly represents a marriage of their combined resources.

Back of an advanced exterior appearance, the small Lincoln has a number of novel design features aimed primarily at easy riding. A low center of gravity—14 inches—in combination with a center-poise spring suspension, are highlights.

The outstanding design feature of the car is in the body construction which does not utilize a chassis but rather an all-steel "bridge truss" body in which the engine is mounted, and to which the running gear is attached. The car weighs between 3600 and 3700 pounds.

Briggs, which is building an initial order of 1000 bodies at its LeBaron custom shop, starts by laying down No. 19½-gage sheet steel for the floor section, then building up all quarter and front panels by a series of welds, 8000 distinct welds being used in each completed car. The top panel, stamped on a 10-ton press out of a 144-inch sheet, is a continuous sweep from windshield to rear.

The rear part of the body is formed in a convex curve closing in luggage and tire compartments. Streamlined rear-wheel shields are standard, and the one-piece steel wheels carry 7.00 x 16-inch tires.

There is no conventional hood, but the top of the engine compartment is formed like an engine hatch and lifts from the front on spring-balanced hinges. The radiator grille, being made by Motor Products, is V-shaped with slightly rounded horizontal bars topped with an airplane motif. Lamps are recessed into the crown of the front fenders, and the twin horns are hidden back of the grille. Four slit vents are placed horizontally in the hood.

Bright Metal Prominent

Conventional running boards have been replaced by narrow, rubber-covered side buffers with polished metal edges. Inside, chrome-plated tubing forms the outer structure of the chair seats. In the two-door job, the seats are bucket type.

Hardware is chromium plated, with molded escutcheons and knobs. The instrument panel is finished in gray with an electric clock and a 100-mile speedometer recessed in the panel directly in front of the driver. Gages for oil, fuel, engine temperature, and an ammeter are grouped around the clock dial's rim. The parking brake is at the left of the driver's seat beneath the cowl.

The car complete has 122-inch wheelbase, 133-inch spring base, 69 inches overall height, and 69 inches overall width. The front tread is 55¼ and rear tread, 58¼ inches. Two body jobs are offered, both closed, one a two-door, the other a four-door. Models come in seven colors.

As previously reported, the motor is a V-12. Each of the banks is set at 75 degrees, and blocks, including cylinder banks, exhaust passages, crankcase, and flywheel housing, are cast for Lincoln in one unit by Ford at the Rouge foundry. The engine assembly then is done at the Lincoln plant.

Small Bore, Stroke

Though a 12, the motor has been designed with noticeably small dimensions—a 2¾-inch bore and a 3¾-inch stroke, piston displacement of 267 inches and compression ratio of 6.7 to 1. It has an S. A. E. rating of 36.3 horsepower, and an actual braking horsepower of 110 at 3900 r.p.m. Because of its relatively small bore and stroke, city and country tests prove gasoline consumption virtually the same as the present Ford V-8 engine.

The Lincoln-Zephr uses the cast steel crankshaft pioneered by Ford; with nine integrally-cast counterbalances; it weighs 80 pounds.

It has four main bearings of the removable insert type, and sleeve-type bearing inserts for the connecting rods. The latter are steel, surfaced with an antifriction material which is a copper-lead alloy so that no "breaking-in" period is required.

Valves are chrome steel, pistons cast alloy steel. Valves are the Ford V-8 type with mushroom ends, and are actuated by a cast alloy iron camshaft with Ford-type pushrods.

Springs are transverse, as in the Ford, 40½ inches long for the front, 46½ inches long for the rear, cantilever type with a two-point mounting

which minimizes unsprung weight.

Other features of the Lincoln-Zephyr include a rubber insulated fan belt mounted directly on the crankshaft, thus acting as a balancer and silencer, a 17-plate battery, 19-gallon fuel tank, 5-gallon radiator, single dry-plate type clutch, cable-controlled mechanical brakes, steering gear ratio of 18 to 1, helical gears in all speeds, double-acting hydraulic shock absorbers, dual down-draft carburetor with an aluminum valve-chamber cover, and cast aluminum cylinder heads.

Lincoln plans to be turning out 50 jobs daily this week, aims at 100 a day by Nov. 11. The bodies have been costly for Briggs to make so far, for although Ford has spent almost $1,000,000 for new jigs and fixtures, no permanent body dies have been bought. The bodies so far are being hand-built. Priced at $1275, Detroit, for the 2-door sedan and $1320 for the 4-door sedan, the Zephyr is about midway between the small Packard and LaSalle.

"How well they will take with the public we can't say, but the next six months ought to give us the answer," said Edsel Ford last Monday to newspapermen previewing the car. "We expect though to be able to turn out 2000 cars a month, soon."

Production the By-Word

If a blind person were asked to identify Detroit today, by using his nose only, he wouldn't have a great deal of trouble. Predominantly, the municipal odor right now reeks of a mixture of fresh automobile paint, cutting oil, and burning welding rod —which spells automobile assemblies. Last week production was 76,740 units compared with 62,015 units the week before. Ford is setting the pace, and has passed 4700 assemblies daily, last week total being 15,150.

Consequently, the pinch on materials is on. Late last week Ford threw off the ban on scheduled shipments of steel and other requisite materials from outside sources. Up until then, suppliers with orders had been on shipping schedules, not permitted to release until purchasing headquarters at Dearborn set the dates.

In addition, Ford is in the midst of a steel buy, mainly of body materials. This follows the fill-in buy of three weeks ago, but neither is as large as the buy of late July, made for 200,000 cars. Even though both blast furnaces are going, Ford has been having difficulty laying down the pig iron it would like to.

There are now about 40,000 of the 1936 V-8's in the field and, as a Ford executive told STEEL last week, Ford sees 200,000 V-8 orders immediately ahead—the presumption being over the next two and certainly no more than the next three months.

Plymouth has been stepping fast at the 1800-unit per day mark, or at the rate of 10,000 per week. For its volume, Plymouth has succeeded remarkably well in getting new cars in the field and in the public's hands.

If Plymouth gets going at the pace necessary to make 500,000 cars in 1936—as it announces—it will find a bottleneck at the foundry, chiefly on engine blocks. Accordingly, it has built up a bank of thousands of 1936 blocks, both against future needs and current requirements. The Chrysler Corp.'s gray iron foundry, closed all October, will be down for at least another week while enlargements are going on and new equipment put in.

For the Chrysler lines themselves, a late model approval by the company's executives has held up starting the assembly lines. Chrysler is going into show time with all hand-made models. Last week only 100 cars for each of the DeSoto and Chrysler lines were produced.

Chrysler has dropped the 138-inch Imperial for 1936 and has trimmed down the number of models from seven to four. X-bridge type frames on the Chrysler six and eight are claimed to be double the rigidity of this year's car; as in Plymouth, the Chrysler six motor has full-length water jacketing.

Both Airstream and Airflow models likewise feature the front lamp device, brought out on Plymouth, that eliminates glare. The Airstream is longer, 117-inch wheelbase, and lower. Dodge prices are now out for 1936 with reductions up to $21.50 per car.

Chevrolet crossed 10,000 assemblies last week on the way up, or at the average rate of 2000 models daily. Most of the Chevrolet dealers are now stocked. With November and December assemblies each calculated for more than the 65,000 jobs made in October, Chevrolet likely will not be in position for another steel "buy" for a while. Steel was bought for 250,000 Chevrolets just as the last 1935 cars were completed.

Well Prepared for Rush

"There will be no shortage of models this year," said W. E. Holler, vice president and general manager of Chevrolet last week. "We were under way on new cars far in advance of the shows and we have, in addition, an advantage of 25 per cent increase in producing capacity, both in assembly plants and in motor, transmission, axle, and other parts' units."

Additional to the detail reported in these columns recently on changes in Chevrolet, the standard models are now 2 inches longer wheelbase, at 109 inches, overall length is now 12½ inches greater, and weight 135 pounds more. Gas tank capacity has been increased three gallons to 14. Front leaf springs have been lengthened 3 inches, rear springs have been shortened 5 inches; consequently, deflection rate has been reduced in front, increased in the rear.

Last week Packard ran into difficulties on its rear-quarter panels. Assemblies at the Packard plant dropped from an average of 310 a day the week before to about 250 a day. The trouble arose over a change in the rear trunk. In the 1936 models this is being built in, and last week saw the changeover, with "bugs" arising on the lines in welding in the rear panels.

Packard, incidentally, foresees tentatively that it has an 80,000-car year ahead lined up for the 120 series. To substantiate this, production would have to continue at its present pace of 7000 a month.

For the reason, more than any other, that a greater amount of materials are in stock and in transit to round out Packard's ambitious building programs, did the company's current liabilities take such a jump in the third-quarter statement.

As predicted here, Auburn has outdone all other manufacturers in going radical this season, with its Cord V-8 front drive model. Most striking, perhaps, is the hood, which features Venetian-blind type louvers on three sides.

Wheelbase is 125 inches, overall height is exactly 5 feet except for the convertible which stands only 58 inches high. Running boards have been eliminated.

The power plant and body have separate frames, bolted together after individual assembly. After all, retractable headlamps were adopted, which are brought into position or concealed by means of a crank on the instrument board.

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1933	1934	1935
Jan.	128,825	155,666	292,817
Feb.	105,447	230,256	335,700
Mar.	115,272	338,434	429,834
Apr.	176,432	352,975	477,746
May	214,411	330,455	364,727
June	249,727	306,477	361,321
July	229,357	264,933	337,044
Aug.	232,855	234,811	240,051
Sept.	191,800	170,007	89,805
Oct.	134,683	131,991	*200,000
10 mo.	1,768,809	2,516,005	3,129,045
Nov.	60,683	83,482	.....
Dec.	80,565	153,624	.....
Year	1,920,057	2,753,111	.....

*Estimated.

Estimated by *Cram's Reports*

Week ended:

Oct. 19	44,416
Oct. 26	62,015
Nov. 2	76,740

WINDOWS OF WASHINGTON

WASHINGTON

A DETERMINED effort is being made in some quarters to head off the Berry NRA industry-labor conference. However, it appears too late, and an announcement of the conference for late November or early December is looked for early this week, possibly on Monday.

Some industrialists who have been opposed to such a conference from the start have made every effort to stop the conference aborning, but others who feel very much the same way about it refuse to come out in the open because they are afraid that they will be criticized for their attitude—and that in spite of the fact that they know no good can come of the conference for industry.

Ammunition from Unions

Meanwhile, Maj. George L. Berry, co-ordinator for industrial co-operation, is sending out communications to 30,000 trade union secretaries asking for information which smells strongly of trying to make a case against industry rather than to "co-ordinate" or to "co-operate" with industry. He is asking for details on violations of labor provisions:

"It is going to be necessary for me to demonstrate two things. First, evidence of the desire of industry for a permanent order resting on fair competition; and, second, evidence of the need for such an order as indicated by what happened in industry after the NRA codes were abolished by the Supreme Court decision of last May. It is in connection with the second requirement that I particularly need your help and co-operation."

Here is where the major is trying to make his case, for he says:

"Information as to the lengthening of the hours of work and reduction in standards of wages since the abolition of the code can best be furnished by employes who are unwilling victims of these changes. I, therefore, ask you to assist me by reporting promptly to me the facts concerning the departures from the labor provisions of codes of which you have factual knowledge.

"As far as humanly possible, I should like this information in such form that it will record the name of the concern which either has cut wages or lengthened hours of work constituting departures from former code provisions; the name of the industry to which the concern belongs; and the percentage which such cut in wages of addition in hours represents as against the wages and hours under the codes. Also, I should like the number of workers affected by these changes."

In connection with this whole storm which is being raised against the contemplated conference in Washington and new legislation along the lines of NRA C. L. Bardo, president of the National Association of Manufacturers states:

"Information which comes to me indicates definitely that virtually no sentiment exists among either large or small manufacturers for a new attempt by the federal government to regulate local industrial operations.

"This belief is based not only upon statements from individual members of the national association of manufacturers, but also from an informal canvass made through spokesmen for other industrial groups who likewise are in constant contact with the manufacturers of the country.

"The people have recently passed through one attempt to regiment commerce into a centrally-controlled collectivist machine. They have seen the results of bureaucratic interference with the free flow of the nation's business life. On the other side of the picture they have witnessed the steadily increasing employment and renewed business activity which has followed the collapse of the NIRA with its arbitrary restrictions."

One of the interesting NRA developments last week was the meeting of labor to take action on its representative at the voluntary agreement hearings for labor conditions. Attending the conference were William Green, president of the A. F. of L., and a number of other high labor officials.

The upshot of the meeting was that it was definitely decided that inasmuch as the unions had nothing to do with the writing of the labor conditions in the voluntary codes and the administration of these conditions, it would not appoint a representative to sit in on the hearings and neither would it approve or disapprove any of the labor conditions in the voluntary codes.

Reasons for Disapproval

In their resolution in this connection the labor leaders stated:

"Resolved, that the labor advisory board disapproves the voluntary agreements submitted by the NRA for the (enumerating various industries) * * * because of the failure to provide labor participation in the negotiations, administration, and enforcement of these provisions, and because of the unsatisfactory labor provisions contained in them.

"Resolved, further, that Dr. A. Howard Myers be authorized in behalf of the labor advisory board to make formal representation giving the position of the board at the hearings which may be held for these agreements."

Last week the first hearings were held at NRA in connection with labor provisions of the so-called voluntary codes. The procedure in these cases is practically identical with the procedure in the old NRA hearings—

Individual NRA for Steel?

A rumor was widespread, but unconfirmed, in Washington Friday that NRA officials are drafting a bill to put the iron and steel industry in a small NRA similar to that designed for the coal industry through the Guffey bill. It was said that similar bills for individual NRAs for automobiles, forest products, and other major industries also were contemplated.

with no witnesses being sworn and with lawyers handling their witnesses as they did during the height of the NRA. As indicated, labor took a negative part in the proceedings, merely being represented and making no comment on the testimony taken.

NO JOBS, NO STEEL ORDERS, AS WORKS PROGRAM LAGS

There is the keenest disappointment in administration circles, and this is not backstairs gossip, over the failure to employ 3,500,000 jobless by Nov. 1.

The time has passed and it is claimed in well-informed circles here that not more than 1,000,000 persons have been put to work under the new emergency program, and of that number 250,000 went into CCC.

There has been a feeling from the start, in some quarters at least, that the President would not be able to put into employment the number of men he had planned.

The explanation is said to lie in the impracticability of the whole conception of making the federal government itself directly and wholly responsible for providing useful work for destitute unemployed workers. In fact, it was stated at the outset of the experiment, by some, that it would prove impracticable to provide public employment for all now on relief.

For many months the relief organization had some 2,000,000 relief workers employed on work relief projects under the direction of FERA. Some had thought it feasible to transfer this group from that relief organization to the new works progress administration, particularly if the personnel in charge of work relief programs in the state and local relief organizations could be taken over by the new administration. It is quite apparent that this was not done, and instead a new federal machine was set up which did not work out smoothly.

BOILER MAKERS ADOPT RULES

Federal trade commission has made public trade practice rules for the steel tubular and firebox boiler manufacturing industry, which have been adopted by the industry and submitted to the commission for its approval. Hearing will be held on the rules Nov. 15 in Washington.

Application for the conference was made to the commission by the Steel Heating Boiler institute, members of which produce 85 per cent by volume of the products of the industry.

The proposed rules are divided in groups I and II. The first group covers trade practices considered to be unfair methods of competition within the meaning of the trade commission act; the second group do not *per se* constitute violations of the law but are considered by the industry to be unethical, uneconomical, or otherwise objectionable.

They Say:

THE steel situation for the next six months looks distinctly optimistic," stated Dr. Harold G. Moulton, president of the Brookings institute, Washington, at a meeting of industrial leaders held in the Schenley hotel, Pittsburgh, Oct. 21. Dr. Moulton has just completed a three-year study of the nation's industries under a $150,000 grant by the Maurice and Laura Falk Foundation.

Dr. Moulton listed three reasons for an optimistic future in the steel industry: (1) Replacement of machinery which should have been replaced at earlier dates. Progress in the steel industry the past summer is evidence that such is going on. (2) Gradual and substantial general business improvement during the past three years. (3) The factor of momentum. Improved rentals, real estate, and general business stability elsewhere had repercussions in the steel markets.

ENGLAND'S RECOVERY NATURAL

"The business boom England is enjoying is a prosperity based on confidence. Without artificial stimulants British industry is going ahead on an even keel. Barring such a calamity as a general European war, peace-time expansion presents an encouraging outlook for a broad resumption of trade and for American exports."—Frederick Salditt, export manager, Harnischfeger Corp., Milwaukee, just returned from Europe.

SEES RAILROAD EARNINGS NEAR

"The railroads are not overcapitalized and when further business expansion takes place, earnings will show that railroad capitalization is justified. Many signs seem to point to brighter business skies," stated W. J. Harahan, president of the Chesapeake & Ohio railroad, addressing the Traffic Club of Pittsburgh, Oct. 21.

Steel in the News

REPUBLIC Steel Corp., Youngstown, O., will shortly release a four-reel sound picture on the manufacture, fabrication, and application of stainless steel—claimed to be the first of its kind. Taken in Republic plants at Canton and Massillon, O., the picture, entitled "Enduro, Republic's Perfected Stainless Steel," details every step in the process.

DROP FIRST STEEL CRUISER

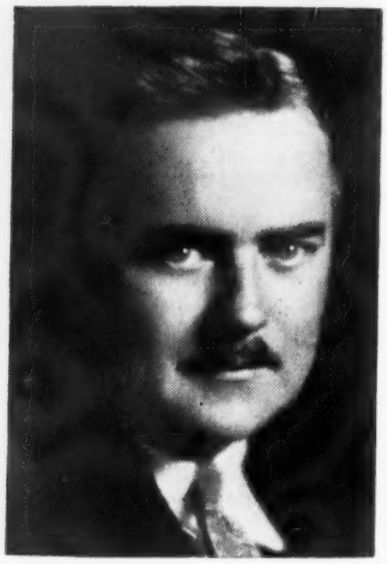
Navy officials last week retired the cruiser ALTON which, when constructed in 1885 as the cruiser CHICAGO, was the first steel ship in the United States navy. Recently the ALTON has been serving as a barracks for the submarine fleet at Pearl Harbor, Hawaii.

New Deal in White House Meals

Because White House conferences often extend through meal time, the Waters-Genter division, Minneapolis, of the McGraw Electric Co. has constructed the thermotainer pictured above to serve the President and his guests. Food can be kept hot by electricity and cold by dry ice for several hours. Shown above, left to right, testing this portable unit, are H. C. Genter, vice president; G. M. Waters, vice president; and F. H. Emery, sales manager, all of the Waters-Genter division. A large compartment-type thermotainer adequate to keep hot food for 150 persons for state dinners is being built for the White House by the same company. Both are fabricated from stainless steel produced by the Republic Steel Corp.

Industrial Men in the News

Pierre Champion, President, Champion Rivet Co.



Still in his early thirties, he now heads up one of the leading rivet manufacturing companies.

Through close association with his father in the management of the company, he is well fitted to take over his new post.

He maintains membership in a number of important technical associations.

PIERRE CHAMPION has been elected president of the Champion Rivet Co., Cleveland, succeeding his father, the late David J. Champion, who died on Sept. 10. The new president is thirty-six years old.

Upon graduation from the University of Notre Dame in 1922, he took a position with the Champion company, being employed in the plant for two years making rivets. In 1928 he was elected vice president in charge of sales.

In 1931, when the company decided to expand the scope of its service to the metal fabricating industry, and accordingly developed the necessary ground work to place before the trade a complete line of coated welding electrodes, Mr. Champion was put in direct charge of this development.

Mr. Champion has been closely associated with his father in the management of the business for the past ten years, and there will be no change in the policies of the company.

Mr. Champion is a member of the American Welding society, Nut, Bolt and Rivet Manufacturers' association, American Iron and Steel institute, and American Boiler Manufacturers' association. He also maintains membership in the Shaker Heights Country and Union clubs, of Cleveland.

♦ ♦ ♦

George H. Spence has been appointed to represent the Carpenter Steel Co., Reading, Pa., in Cincinnati and southwestern Ohio, beginning Nov. 1. Mr. Spence was formerly with the Brown & Sharpe Mfg. Co., Providence, R. I., and more recently Cleveland district sales manager of Bliss & Laughlin Inc., Harvey, Ill.

♦ ♦ ♦

N. H. Orr has been appointed general manager of sales of the Colorado Fuel & Iron Co., Denver. This represents a step on the part of Colorado's largest industrial enterprise to reorganize and build up its sales activities.

Mr. Orr, until recently, was a member of the staff of the American Iron and Steel institute, New York. After graduating from the Carnegie Institute of Technology, Pittsburgh, in 1909, he joined the staff of the American Bridge Co., where he continued until 1926. He was then engaged by the Jones & Laughlin Steel Corp., Pittsburgh, in sales work. His knowledge and long experience in the steel business led to his selection by the Institute, where he became an important member of its staff.

N. H. Orr

♦ ♦ ♦

F. A. Dodds has been elected manager of sales for the Brown-Wales Co., Boston. A native of Boston, he received his early education in the public schools of that city. Following graduation from Boston university in 1919, he began his career in the sales department of the company, advancing steadily to the post of head salesman, and subsequently as manager of sales.

F. A. Dodds

♦ ♦ ♦

H. Robert Swanson has been elected vice president in charge of sales and engineering of Alco Products Inc., New York, division of American Locomotive Co. Mr. Swanson has been vice president, primarily in charge of engineering, since formation of the company late in 1930. A native of New York, he obtained his higher education at Hobart college from which he was graduated in 1919, and the Massachusetts Institute of Technology from which he was graduated in chemical engineering in 1921. Prior to his affiliation with Alco Products he was employed by Proctor & Gamble Co., Atlantic Refining Co., and Power Specialty Co.

Kirby K. Watt, for the past six years general manager of the Silica

Products Co., Kansas City, Mo., has been named general manager of Alco Products. A native of Kansas, he received his early education there, graduating from Kansas State college in 1911 with the degree of B. S. in engineering. He was associated successively with the General Electric Co., Allen Machine Co., Fargo Engineering Co., Sinclair Refining Co., Celite Products Co., M. W. Kellogg Co., and for a time was engaged in private engineering practice. He is a member of the American Society of Civil Engineers.

John H. Erter, since 1931 contract engineer, supervising mechanical design, construction and operation of Alco Products, has been appointed assistant general manager. Graduating from the School of Petroleum Technology, University of Oklahoma, in 1918, he entered the chemical warfare service as a control chemist at Willoughby, O. Following his discharge from war service, Mr. Erter was associated with Cosden & Co., Carter Oil Co., Anderson-Pritchard Oil Corp., Marland Refining Co., and Foster Wheeler Corp.

♦ ♦ ♦

E. R. Garlick has been placed in charge of the Cleveland office of the Great Lakes Steel Corp., division of National Steel Corp., which has just been opened. He formerly was connected with the Sharon Steel Hoop Co.

♦ ♦ ♦

O. A. Muenz, 50 Church street, New York, has been appointed by the Ingersoll Milling Machine Co., Rockford, Ill., to handle its line of small tools and Ingersoll cutters in metropolitan New York, southeastern New York, southwestern Connecticut, and northern New Jersey.

♦ ♦ ♦

David F. Austin has been appointed manager of sales of the Chicago district of Carnegie-Illinois Steel Corp., Pittsburgh. Mr. Austin, who, since 1933, has been manager of sales of the Pittsburgh district, began his career with the United States Steel Corp. in 1918, with the Federal Shipbuilding Co. His affiliation with Carnegie Steel Co.'s sales department commenced about eight years ago, during which time he held, successively, the positions of assistant manager of sales and manager of sales of the Cincinnati district, before being transferred to Pittsburgh.

D. F. Austin

T. Lane Watson has been appointed manager of western sales in the bar, strip, and semifinished materials division for Carnegie-Illinois Steel Corp., with offices in Chicago. Mr. Watson entered the service of Carnegie Steel Co. in 1910 in the general sales department at Pittsburgh. He was appointed assistant manager of the bar, strip, and semifinished division sales on Nov. 1, 1932, and assistant manager of the Cleveland district sales office on April 1, 1935.

T. Lane Watson

Leslie B. Worthington has been named manager of sales in the St. Paul district for the Carnegie-Illinois Steel Corp. Mr. Worthington entered the employ of Illinois Steel Co. immediately after graduation from the University of Illinois in 1923. Following a period of apprenticeship at the South works, he entered the general sales department, where he was employed in various capacities until June, 1934, when he was appointed assistant manager of sales of the Chicago district.

♦ ♦ ♦

Herschel V. Beasley has been added to the technical staff of the International Nickel Co. Inc., New York. He will make his headquarters in the New York office. His activities will include problems involving the production and application of alloy cast irons.

L. B. Worthington

Prior to his connection with International Nickel he held responsible positions in the Delco-Remy division of General Motors Corp., Estate Stove Co., and the Centre Foundry & Machine Co. In addition, he has carried on research into steel pouring practice at the Mellon Institute of Industrial Research and was a research fellow at the United States bureau of mines.

♦ ♦ ♦

John E. Garlent, formerly works manager of Motor Wheel Corp., Lansing, Mich., has been made vice president in charge of manufacturing.

G. Harold Hunt, chief engineer, has been made vice president in charge of engineering.

M. F. Cotes, formerly works manager of the heating department, has been appointed vice president in charge of the heater division.

♦ ♦ ♦

M. S. Metzger has been appointed supervisor of the central pattern department of the Chrysler Corp., Detroit.

E. A. Peterson has been named foundry manager.

These departments were operating as one unit under Merton B. Lamkins, who had the title of general foundry manager, prior to his death Sept. 27.

♦ ♦ ♦

Edward E. Hughes, formerly president of the Franklin Steel Works, Franklin, Pa., from which position he retired in 1920, was married Oct. 30, to Mrs. Mina Miller Edison, widow of the late Thomas Alva Edison, at Chautauqua, N. Y. Mr. Hughes and Mrs. Edison were childhood playmates at Chautauqua.

♦ ♦ ♦

Otto de Lorenzi has been named assistant general sales manager of

Combustion Engineering Co. Inc., New York. Except for two years in the American expeditionary forces, Mr. de Lorenzi has been with the company since 1916 in various engineering capacities. He is a graduate of Cornell university, member of the A.S.M.E., and a licensed professional engineer.

♦ ♦ ♦

George W. Morrison, Ingersoll-Rand Co., Phillipsburg, N. J., sailed Oct. 19 for a 2-month trip to Europe.

♦ ♦ ♦

Ralph Leavenworth, general advertising manager, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been appointed a vice chairman of the Association of National Advertisers.

George C. Congdon, advertising manager, Jones & Laughlin Steel Corp., Pittsburgh, has been appointed a director.

♦ ♦ ♦

Will E. Rutz, plant manager, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., has been elected president of the Fond du Lac association of commerce.

♦ ♦ ♦

Benjamin F. Fairless, president, Carnegie-Illinois Steel Corp., Pittsburgh, will be honored at a luncheon given by the Chamber of Commerce, Pittsburgh, Nov. 4.

A. W. Robertson, chairman of the board, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., will be guest speaker.

♦ ♦ ♦

Arthur A. Aranson resigned as assistant manager of purchases of the International Harvester Co., Chicago, effective Oct. 31, to become assistant to the president of the Crucible Steel Co. of America, effective Nov. 1, with headquarters in New York. For the last 30 years Mr. Aranson has been associated with the International Harvester Co.

A farewell dinner tendered in honor of Mr. Aranson, Oct. 31, at the Chicago Athletic association, was attended by many important steel men.

Activities of Steel Users and Makers

PITTSBURGH COMMISSION OF INDUSTRIAL EXPANSION has been incorporated in Pennsylvania as a non-profit organization, the purpose of which is to bring new industries to Pittsburgh and expand industries already located there.

A committee of 12 leading Pittsburgh citizens is backing the commission, including S. C. Hackett, president, Jones & Laughlin Steel Corp.; A. W. Robertson, chairman, Westinghouse Electric & Mfg. Co.; L. F. Rains, president, A. M. Byers Co.; Frank R. Phillips, president, Philadelphia Co.; and H. S. Wherrett, president, Pittsburgh Plate Glass Co.

♦ ♦ ♦

Ingersoll Milling Machine Co., Rockford, Ill., has appointed the Wright & Gade Equipment Co., 3701 North Broad street, Philadelphia, to handle sales of Ingersoll cutters in the Philadelphia area, eastern Pennsylvania, southern New Jersey, Delaware, Maryland, and Virginia.

♦ ♦ ♦

American Rolling Mill Co., Middletown, O., has acquired the Calco Iron Pipe Co. Ltd., West Berkeley, Calif., through the exchange of 72,500 shares of American Rolling Mill common stock. H. W. Force, founder of Calco, will continue as managing executive.

♦ ♦ ♦

Udylite Co., Detroit, has appointed Scobell Chemical Co., Rochester, N. Y., distributor for its complete line of plating and polishing supplies and equipment.

Homer D. Williams To Retire Feb. 1

HOMER D. WILLIAMS, president of Pittsburgh Steel Co., Pittsburgh, and at one time president of Carnegie Steel Co., Pittsburgh, will retire on Feb. 1, 1936, after an association of 55 years with the steel industry. A successor as chief executive of Pittsburgh Steel Co. has not yet been chosen.

Homer D. Williams

Mr. Williams, born in 1863 at Johnstown, Pa., began his career at the age of 17 with the Cambria Steel Co., Johnstown, as a carbon boy. Later he pursued special courses in chemistry and metallurgy at Lehigh university.

His next business association was as chemist in the Joliet, Ill., works of Illinois Steel Co., and later he was with the Colorado Fuel & Iron Co., Denver, and the Maryland Steel Co., Sparrows Point, Md.

In 1899 Mr. Williams went to Homestead, Pa., works of Carnegie and was placed in charge of the bessemer department there. A short time later he was appointed assistant general superintendent, following which he became general superintendent in 1903 of the Duquesne, Pa., works of Carnegie.

In 1915 he was appointed president of Carnegie, and in 1925 he became president of the Pittsburgh Steel Co.

Died:

WILLIAM A. HERRON, retired president, Lewis Foundry & Machine Co., Groveton, Pa., in Pittsburgh, Oct. 27.

♦ ♦ ♦

Addison H. Leitch, 76, president and treasurer of the Westmorland Brick Co., Pittsburgh, in that city, Oct. 24.

♦ ♦ ♦

George A. Pendergast, affiliated with Luria Bros. & Co. Inc., Reading, Pa., for 26 years, in Reading, Oct. 30.

♦ ♦ ♦

John H. Klepinger, 64, for 15 years associated with the engineering staff of Link-Belt Co., Chicago, in Lafayette, Ind., Oct. 26.

♦ ♦ ♦

John B. Stickle, 35, president and general manager of the Stickle Steam Specialties Co., Indianapolis, in that city, recently.

♦ ♦ ♦

Fred J. White, 65, president of the Fred J. White Iron Works, Washington, in that city, recently. The company was founded by his father before the Civil war.

♦ ♦ ♦

George G. Durham, 63, former general manager of the Niagara Falls Machine & Foundry Co., and more recently with the Ontario Hydro Commission, in Niagara Falls, Ont., recently.

♦ ♦ ♦

Arthur Huehn, consulting engineer in Pittsburgh, in that city, Oct. 27. He was a graduate of the Polytechnical University of Berlin and had previously been connected with General Electric Co. and James McNeil Construction Co.

♦ ♦ ♦

Seymour Guthrie Sr., 71, secretary and treasurer of the Kellogg Switchboard & Supply Co., Chicago, in that city, Oct. 30. He had been associated with the company in his recent capacity since 1902.

EDITORIAL

To Avert Shortage in Key Men, Start Training Now!

DURING the past few years numerous far-sighted leaders of industry have issued repeated warnings against the danger of an acute shortage of foremen, inspectors and skilled workmen. Recognizing the soundness of this advice, the managements of hundreds of companies went to great lengths, even during the darkest days of the depression, to retain or preserve their organization for training employes.

Unfortunately this practice was not followed by all companies. In some cases, operations fell to such a low point that it was impossible to provide for training of any kind. In others, executives were so completely absorbed in the problems incidental to making both ends meet that the question of providing efficient manpower for future needs was put aside for later consideration.

Because of these and other extenuating circumstances, or in some instances through oversight or neglect, industry generally is face to face with a real shortage of employes competent to hold key positions or to perform specialized, skilled work. The difficulty experienced in recent months in finding qualified men for certain jobs has served to emphasize the seriousness of the problem. This should be a cue to employers to act promptly to correct the situation.

Industry Should Train More Employes and Training Should Meet Changed Conditions

Obviously the most satisfactory solution lies in systematic training. In this connection, it should be remembered that the task involves not only the selecting and schooling of a sufficient number of workmen to make up the deficiency caused by slack times, but also the improvement of training methods necessary to meet the more exacting requirements imposed by today's more intricate manufacturing processes. It is a dual problem embracing the quality as well as the quantity of adequately trained personnel.

It is gratifying to note that machine tool builders, who normally require a higher proportion of skilled workers to total number of employes than manufacturers in many other lines of industry, recognize that the need of better training is as urgent as that of training more men. The report of the committee on apprentice training, presented last week at the convention of the National Machine Tool Builders' association, showed clearly why the methods of training employed 20, or even 10 years ago, are poorly adapted to today's conditions.

The report emphasized the fact that the early apprenticeship courses were designed for boys of limited education, provided for a long period of training, tended to give the apprentice a narrow outlook and usually afforded him experience adapted to one shop—probably a small one. Today, thanks to the influence of the automobile, radio, airplane, etc., boys are more mechanically minded than they were in previous generations. The course of training need not cover as long a period. On the other hand, the operations in the average shop are more complicated. Machines are more intricate. Supervision, control and inspection are more important than in previous years. Shops are larger.

Committee Suggests Five Types of Educational Courses for Industrial Personnel

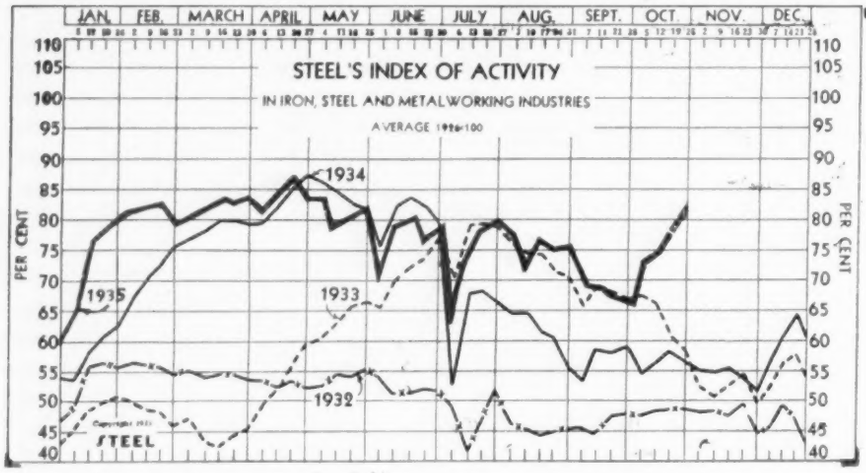
For these and other reasons, according to the committee's report, a different kind of training is required. To meet modern conditions, the committee recommends that employers consider five different methods of training:

1. Modern apprentice courses, such as those conducted by the Brown & Sharpe Mfg. Co., Cincinnati Milling Machine Co., General Electric Co., Ford Motor Co., International Correspondence Schools, National Metal Trades association, etc.
2. Trade schools.
3. Mechanic arts courses.
4. Co-operative courses, such as those offered by the University of Cincinnati.
5. Short courses (vestibule schools), for the rapid training of employes for specialized work.

Investigation by the committee showed that some machine tool builders are utilizing three of the five methods and one is employing four. It would seem that under the existing circumstances today, every company of moderate or large size in the metalworking industries should be conducting at least two types of training—one for apprentices and one for foremen, inspectors and other noncommissioned officers of industry.

During the present period of recovery, when so much emphasis is being placed upon the advantages of modern, efficient equipment, it will be well for executives to place equal, if not greater stress upon the advantages of a competent and adequate personnel.

THE BUSINESS TREND



STEEL'S *index of activity in the iron, steel and metalworking industries increased 5.1 points to 82.5 in the week ending Oct. 26:*

Week ending	1935	1934	1933	1932
Aug. 17	77.5	61.4	74.2	44.9
Aug. 24	77.0	60.3	71.6	45.2
Aug. 31	77.3	55.1	70.3	45.4
Sept. 7	70.9	53.5	65.5	44.9
Sept. 14	70.1	58.7	69.1	47.8
Sept. 21	69.4	58.1	68.2	48.0
Sept. 28	68.5	59.3	66.9	47.7
Oct. 5	73.3	54.7	67.4	48.4
Oct. 12	74.9	56.4	66.0	48.7
Oct. 19	77.4†	58.2	60.9	48.7
Oct. 26	82.5*	56.3	58.9	48.3

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL.) *Average for 1926 equals 100, weighted as follows: Steel rate 40, and car loadings, power output and auto assemblies each 20.*

Business Enters Eleventh Month at Brisk Pace

INDUSTRIAL activity continues to expand steadily. STEEL'S index for the last full week of October crossed the 80 mark and stands at 82.5. This is the highest point recorded since the week ending May 28.

Among the factors responsible for this latest rise in the index is another week of record-breaking electric power output. The total of 1,895,817,000 kilowatt-hours, reported for the week ending Oct. 26, not only sets a new high mark —the fourth in four consecutive weeks—but it also exceeds the highest output in any predepression week by 35,800,000 kilowatt-hours or nearly 2 per cent.

Automobile output is being stepped up rapidly and steelworks operations again are forging upward moderately. Freight car loadings continue well about the 700,000-car mark, but have receded slightly from the recent high point attained in the second week of October.

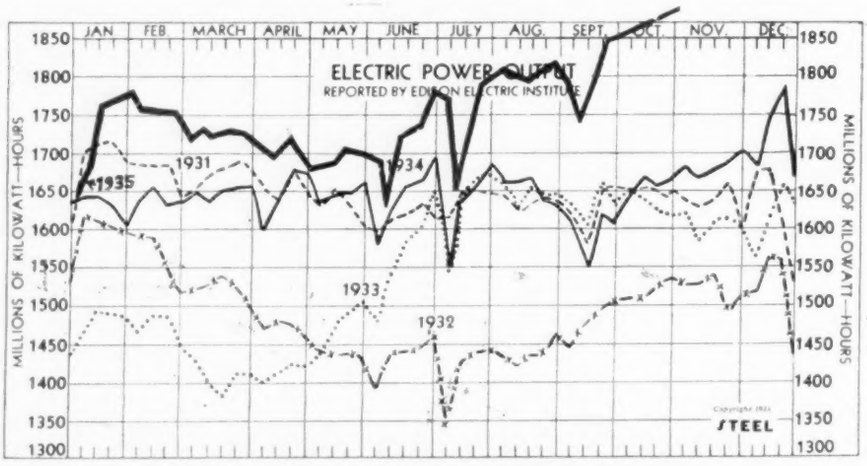
The improvement in the physical volume of business, combined with the generally more favorable financial statements covering third-quarter earnings, has helped to create new confidence which is being reflected in fresh inquiry for equipment. This is particularly noticeable in the case of railroad rolling stock.

Undoubtedly the question of prices will enter more prominently into the business picture during the remainder of the current quarter. Following the recent show of strength in nonferrous metals and iron and steel scrap, prices of pig iron advanced in certain markets. Perceptible undercurrents are at work in the finished steel markets, which may result in more definite price movements in the near future.

Million Kw.-Hr.

1935

Oct. 26	1,895
Oct. 19	1,863
Oct. 12	1,867
Oct. 5	1,863
Sept. 28	1,857
Sept. 21	1,851
Sept. 14	1,827
Sept. 7	1,752
Aug. 31	1,809
Aug. 24	1,839
Aug. 17	1,832
Aug. 10	1,819



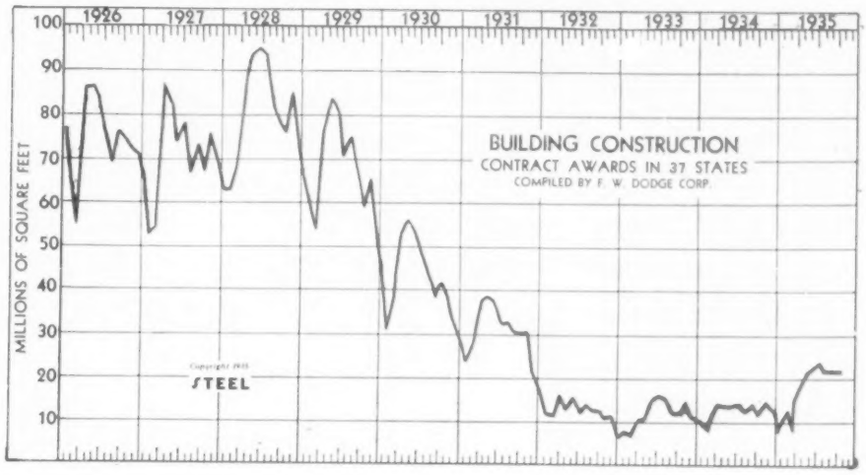
Million Kw.-Hr.

1934

Oct. 27	1,677
Oct. 20	1,667
Oct. 13	1,656
Oct. 6	1,659
Sept. 29	1,648
Sept. 22	1,630
Sept. 15	1,633
Sept. 8	1,564
Sept. 1	1,625
Aug. 25	1,648
Aug. 18	1,674
Aug. 11	1,659

September Building Awards Decline Moderately

	Square Feet	
	1935	1934
January	11,245,100	9,568,700
February	9,670,300	8,176,300
March	15,873,100	14,788,900
April	19,981,100	14,207,100
May	22,276,200	14,664,400
June	22,878,800	13,986,500
July	21,565,900	13,250,000
August	21,545,400	14,259,000
September	21,365,700	12,510,300
October		15,098,100
November		12,780,800
December		9,193,306

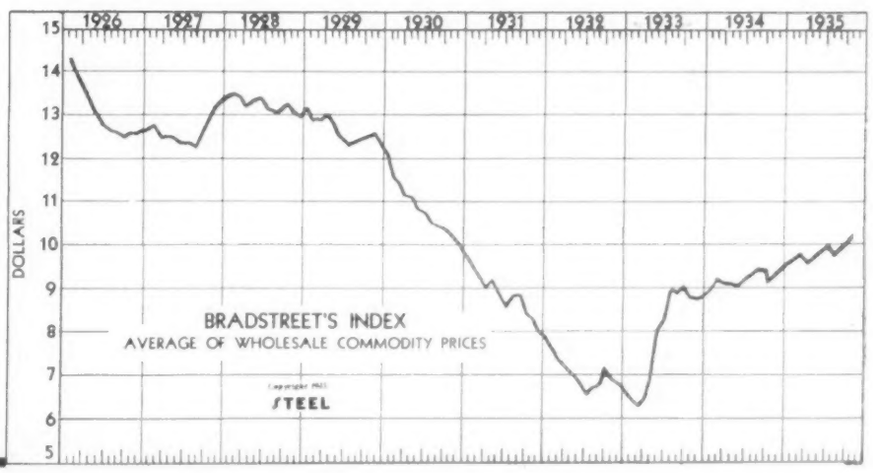


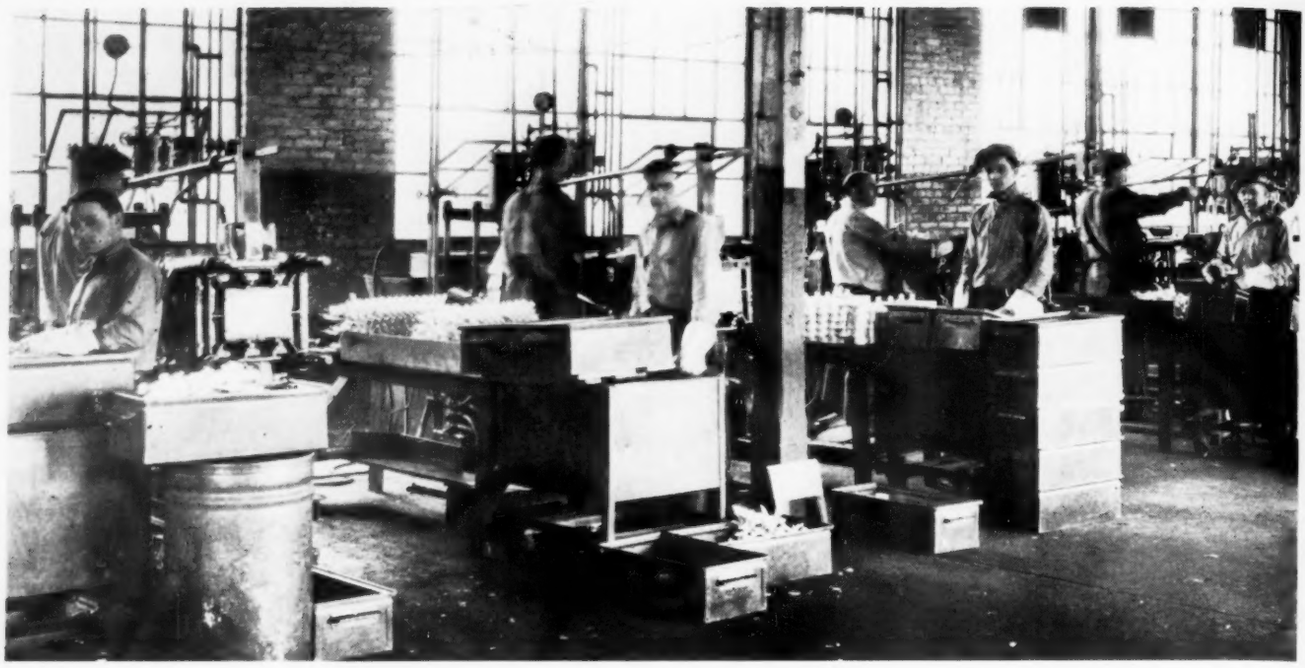
Industrial Production Advances to 88

	1935	1934	1933
January	91	78	65
February	89	81	64
March	88	84	60
April	86	85	67
May	85	86	77
June	86	84	91
July	86	75	100
August	87	73	91
September	88	71	84
October	....	73	77
November	....	74	72
December	....	86	75

Bradstreet's Commodity Prices Continue Climb

	1935	1934
January 1	$9.49	$9.01
February 1	9.78	9.26
March 1	9.79	9.17
April 1	9.66	9.16
May 1	9.79	9.14
June 1	9.90	9.24
July 1	9.84	9.32
August 1	9.91	9.48
September 1	10.00	9.45
October 1	10.17	9.27
November 1	.....	9.29
December 1	.....	9.49





A row of five die casting machines in the plant of the Schultz Die Casting Co. Castings cool on the benches behind the machine operators. Here they are given a preliminary inspection; imperfect castings are thrown out and perfect ones are loaded into tote boxes and transferred to the cleaning department

Applies Modern Methods To Production of High Quality Die Castings

BY HERBERT CHASE

ONE of the outstanding successes of recent years in the field of die casting production has been achieved in the plant of the Schultz Die Casting Co., Toledo, O. This is true not alone from a commercial angle, but in respect to the rate and quality of production as well as a uniformity which is noteworthy. From a business standpoint, the success is particularly remarkable, because it was achieved during depression years when many established die casters found it difficult to operate on a profitable basis.

Starting in 1930, with only three die casting machines, capacity of the Schultz plant has been expanded steadily with continuous production, mostly on a two-shift and some on a three-shift basis, until today 14 machines are kept busy night and day and the addition of more machines is in contemplation. Daily production in two shifts commonly runs from 100,000 to 150,000 castings.

Elements in this success include: First, a long and thorough knowledge of the die casting business; second, the use of simple, efficient and sturdy die-casting machines designed and built in the new shop; and, third, the use of a closely-controlled and rather low casting temperature with casting pressures which are considerably higher than are common in die casting work. Expert die design and the production of well-made and well-finished dies have also been factors in turning out castings of high grade and with a finish so smooth that only a light buffing is necessary in most instances to yield a surface suitable for plating.

Density and Strength Higher

By the use of pressures on the metal averaging about 1500 pounds per square inch, of temperatures averaging about 770 degrees Fahr. and of the highest grades of zinc alloy available, castings of maximum density and strength are obtained. The same factors, in addition to careful die construction, result in castings which are held within close dimensional limits. Electric clock frames measuring about 3 by 4 inches, for example, are regularly produced with seven center distances held within plus or minus 0.001-inch and cored shaft holes within 0.0005-inch diameter on a casting in which section thickness runs about 0.042-inch. In the case of smaller parts, still closer limits are held, of course.

Use of high pressures also has facilitated the production of castings of exceedingly thin section. One elbow casting about $1\frac{1}{2}$ inches overall, with cores at 90 degrees and of about 9/16 and $\frac{7}{8}$-inch diameter, respectively, was produced with walls only 0.015-inch thick. Castings having some walls of 0.025-inch thickness are now quite commonly made in this shop. Heavier sections naturally are required in the case of large parts,

but the use of high pressures makes it possible to use the thinnest feasible section and in consequence the lightest casting possible with a zinc alloy. Accompanying illustrations show typical castings produced in the Schultz plant.

To date, production has been confined to castings of medium to moderately small size, as the machines used are best adapted to this class of work and these sizes are in greatest demand. Very small parts are made also, chiefly in multiple-cavity dies; and unit dies, adapted for use in special holders taking up to four small dies, are also employed, especially when the quantity of parts needed does not justify the expense of multiple-cavity dies. This, in effect, gives the advantage of lower die cost and a moderate piece price, because four or more castings can be made at each shot of the machine.

Zinc-Base Castings

Since zinc alloys not only cast to best advantage, but have excellent properties, are also low in cost and constitute some 75 per cent or more of the total demand, this shop has concentrated on the production of this type exclusively. Zamak alloys, produced under licenses from the New Jersey Zinc Co., New York, are used. They require the exclusive use of high-purity (99.99+ per cent) zinc, being made to meet both A.S.T.M. and S.A.E. specifications. No scrap metal is permitted in the plant. Meltings include only virgin metals and sprues, gates and trimmings from castings made within the plant. This, of course, eliminates the possibility of contamination in alloys, as is so necessary in making satisfactory zinc die castings.

Any of the Zamak alloys which may be ordered by customers is used, but those corresponding to Nos. 2 and 3 are most generally cast. No. 3 is now most frequently specified, but much of No. 2 is still asked for and a few customers call for a mixture of Nos. 2 and 3. The composition and some properties of these alloys are given in the accompanying table. No. 3, which contains no copper, has a lower tensile strength than No. 2, but is subject to almost no dimensional change in aging after an initial period of about four weeks. Although No. 2 is subject to a slight dimensional growth — less than 0.0004-inch per inch on an average in three years—this change is so slight as to be practically negligible in nearly all applications. The tensile strength, about 47,000 pounds per square inch average, of No. 2, as well as the per cent elongation, increase with aging, but its impact strength decreases. No. 3 alloy, on the other hand, has one of the highest impact strengths of any common cast metal, and its impact strength increases with aging.

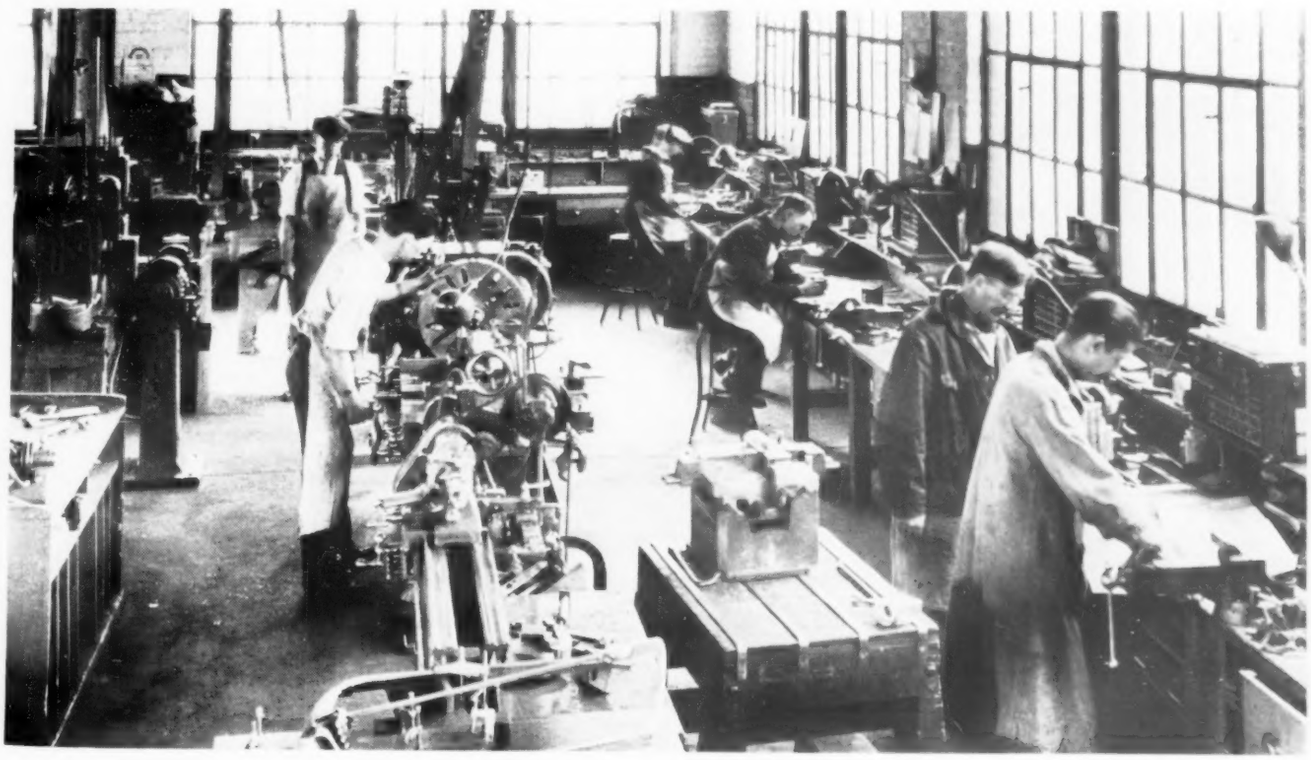
Early in its history, this shop purchased its alloys as such, but as the plant grew it was thought that some economies would be realized by making its own alloys to the same specifications, and furnaces for this operation were introduced. This also permits delivering molten metal to the die-casting machines in small wagons instead of melting at the machines.

Melting furnaces, as well as the pots in the individual machines, are gas-fired and have automatic controls which hold the metal temperature within a range of about 10 degrees Fahr. That temperature which gives the best results for each individual casting is determined by careful test when the die is first put into use and thereafter is set accordingly on the temperature regulator whenever the die is in use. This temperature regulator is a product of the Wilson-Maeulen Pyrometer Division, Foxboro Co., Foxboro, Mass. There is, of course, one of these control instruments for each machine, but all the instruments are grouped in a cabinet at one side of the casting room.

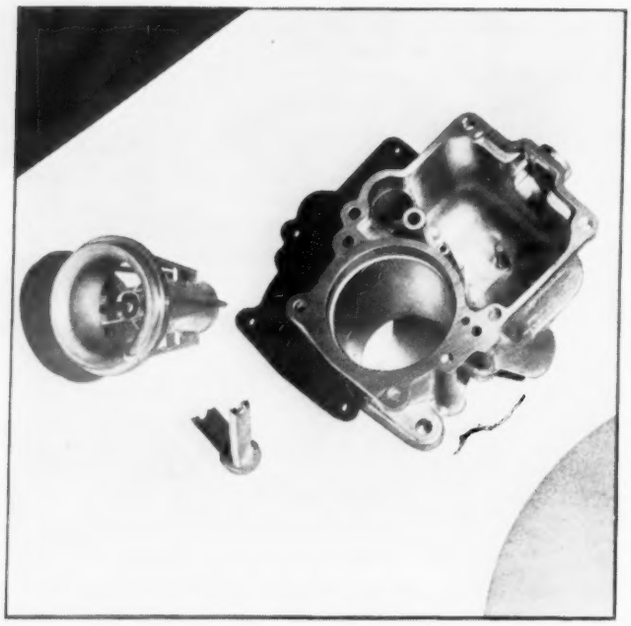
Avoid Oxidation of Metal

Since molten metal at the approximate temperature desired for use is delivered to each machine, the addition of each charge makes very little change in the temperature of the metal in the pots of the machines, and much less than if bar metal was added at the machine. All containers for molten metal are kept covered, so that oxidation of the metal is minimized and clean metal is always fed to the dies.

The casting machines were designed by the Schultz company and were built in its own shop. In a general way, they are similar to more or less conventional types, but they



Section of the toolroom where all dies used in the plant are constructed. Special care is exercised in finishing the dies as well as in their design and this has much to do with the high grade of castings turned out



Casing and other parts for a Tillotson carburetor are shown in the illustration at the left. The reed cage at the left is a particularly difficult piece, involving thin sections and somewhat complex coring. At the right is a panel for an Arvin automobile radio die cast in thin sections and with a fine finish

incorporate numerous refinements by virtue of which they reduce maintenance to a minimum, facilitate the casting process and maintain perfect alignment of the dies. A toggle mechanism is used to open and close the dies, and this mechanism is actuated in turn by a crank which is turned by a hydraulically moved rack engaging a gear segment on the crankshaft.

Each machine is self-contained and includes its own driving motor operating a pump made by Vickers Inc., Detroit. This pump is designed to produce both a large flow at low pressure and a reduced flow at high pressure. Oil at low pressure is employed for rapid traverse of the dies in closing and opening, and the high pressure produces a very high locking pressure which is required, of course, when high metal pressures are used. Metal is fed into the dies by a plunger of 1¾ to 2 inches diameter with 8-inch effective stroke and actuated by an air cylinder of 7-inch diameter to which air at 110 pounds per square inch pressure is fed from the air line of the shop.

The four 2-inch tie rods of the machine act also as ways for the back half of the die. They are spaced 16 inches apart. This makes the die, which has a maximum opening of 8½ inches, readily accessible. All moving parts are well lubricated and there is an oil reservoir for the hydraulic pump in the base of the machine. The metal pot is enclosed and well insulated to conserve heat and to avoid excessive temperatures adjacent to the machine.

Die opening and closing is controlled by a single lever and operation of the air cylinder by a second lever which, of course, is interlocked so that the valve cannot be operated until the dies are closed and locked. Only a very small guard, about 6 inches wide, is provided against spatter of metal from the dies, yet no operator has ever been injured by such spatter. This is partly because adjustment of the dies is made only at the one central point where the toggle mechanism applies pressure to the dies. The latter, in consequence, cannot be thrown out of alignment and so always make a joint such that, if the setup is correct, no spatter can occur.

Dies May Be Cooled

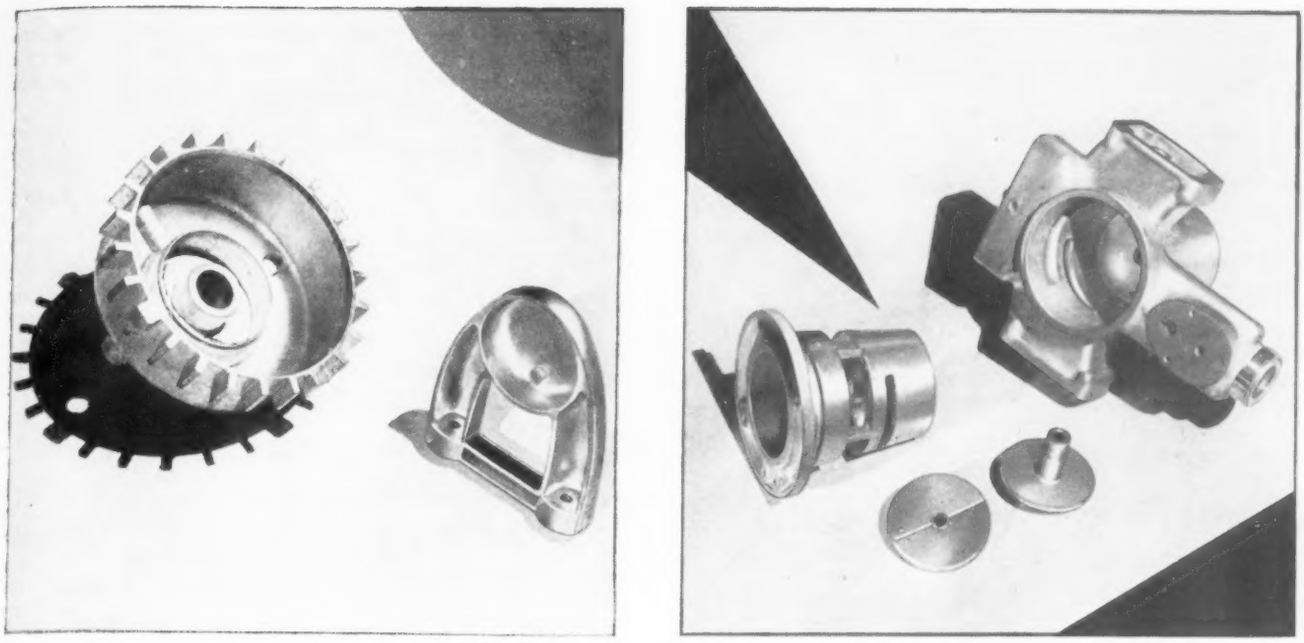
Provision is made for circulating water through the dies when required. When castings are of such section that they cool rapidly, speeds as high as 600 shots an hour are maintained indefinitely. In general, side cores and slides are arranged for hand operation, usually by means of rack and pinion, but means for automatic operation are provided when this is advantageous. Ejector pins and core pins parallel to the axis of the machine are actuated in the usual way as the dies open.

Operators remove castings from

Chemical Compositions and Physical Properties of Standard Zinc-Base Die Casting Alloys

	Zamak Alloy No. 2	Zamak Alloy No. 3
Corresponding A. S. T. M. No.	21	23
Corresponding S. A. E. No.	921	903
Composition, per cent:		
Aluminum	3.90-4.30	3.90-4.30
Copper	2.50-2.90	0.03 max.
Magnesium	0.02-0.05	0.03-0.06
Iron	0.100 max.	0.100 max.
Lead	0.007 max.	0.007 max.
Cadmium	0.005 max.	0.005 max.
Tin	0.005 max.	0.005 max.
Zinc	remainder	remainder
Tensile strength, pounds per square inch	47,300	36,100
Impact strength, Charpy as measured on ¼ x ¼-inch bar, foot-pounds	15.00	18.25
Elongation, per cent in 2 inches	8.4	4.7
Compressive strength, pounds per square inch	93,100	60,500
Brinell hardness, 500 kg., 10 mm. ball, 30 sec.	83	62
Specific gravity	6.754	6.664
Shearing strength, pounds per square inch	45,800	30,900
Melting point, degrees Fahr.	733.6	727.9

Data furnished by New Jersey Zinc Co. To obtain alloys meeting the above specifications, it is necessary to employ high-purity (99.99 + per cent) zinc, such as "Horse Head Special."

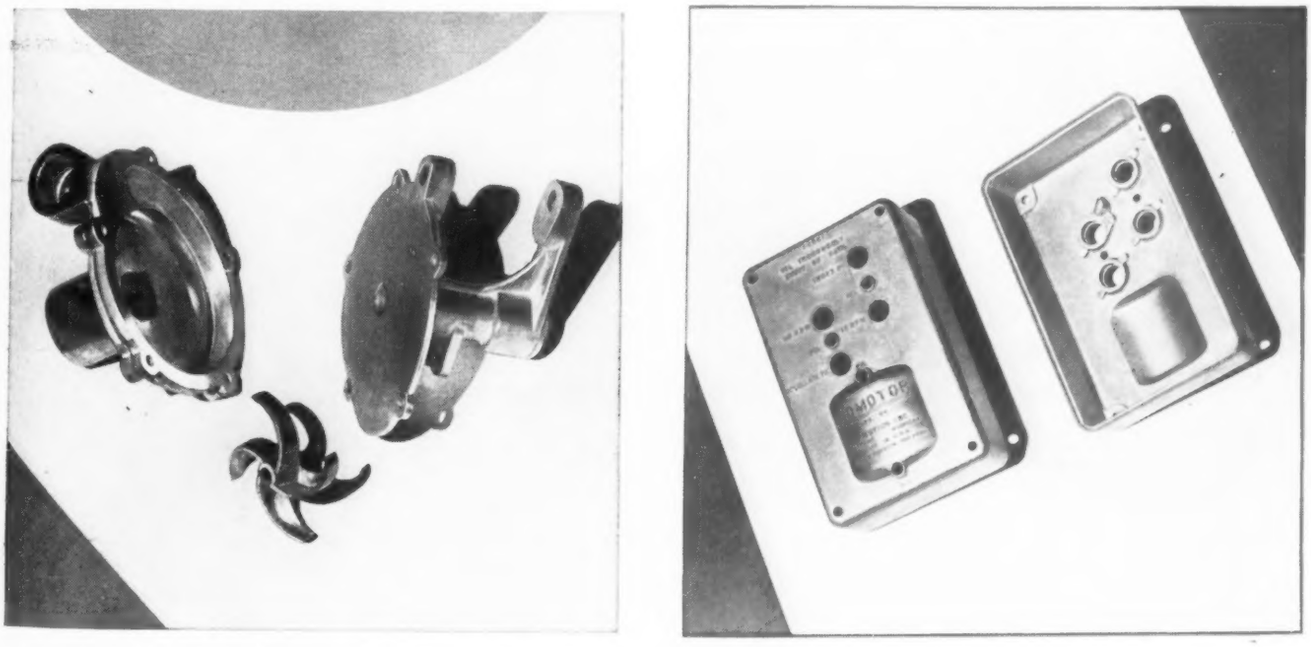


Die cast motor support bracket and case with cooling ribs made for the A. G. Redmond Co. are shown at the left. Typical of production in the Schultz plant are the castings shown at the right. They are a valve body, key and check valve for a gas and anaesthetic machine manufactured by the McKesson Appliance Co.

the machines by hand and lay them on metal-topped benches beside the machines. Here they are cooled by an air blast from an electric fan. As there is no stacking of the castings while they are still warm, warpage is avoided. Five casting machines and their adjacent benches are shown in one of the accompanying illustrations. As castings are pushed along the benches, they are picked up by preliminary inspectors who break or saw off gates and sprues and who also throw out any defective castings. This avoids the chance of wasted cleaning operations on defective castings, and, as the inspectors work in close co-operation with the machine operators, the latter are quickly informed of any recurring defects without delaying the operation of the machine to make a close examination themselves of the castings as the latter are removed from the machine. Band saws, for cutting off gates when the latter are too heavy to be broken off readily by hand, are provided for the inspectors.

Acknowledgement is made to the New Jersey Zinc Co., New York, for the accompanying illustrations of typical die castings produced in the Schultz plant

From the inspection room, castings are delivered in tote boxes to the adjacent cleaning department where fins are removed and any required machine operations, such as thread-



Parts for a water pump assembly supplied for a General Electric washing machine are shown at the left. They are typical of many similar parts for electrical appliances produced in the Schultz plant. At the right are shown a die cast case and cover for an animated advertising display, a product of the A. G. Redmond Co. The castings are sharp and clean

ing, tapping or reaming are performed. It is the policy of this shop to do cleaning by machine wherever possible and especially to avoid hand filing except where it is the only feasible method of cleaning. Hand reamers or hole chamfering tools are used occasionally, but only when this happens to be faster or more convenient than a similar operation on a machine. Special cleaning, shaving and shearing dies are provided for each casting which is best cleaned in this way and their cost is added to the initial die charge. This policy results in well cleaned and economically cleaned castings and is in keeping with the efforts of the shop to turn out only the highest grade of product.

Other Cleaning Equipment

Much cleaning is done in punch presses and kick presses, but drill presses and lathes are used for many simple cleaning operations and occasional milling is done when required for undercuts or special work. For cleaning fins from holes, and similar work, a very convenient and inexpensive though accurate form of single or double bench fixture is much used. These fixtures comprise a simple jig for holding the work, holders for the necessary tools, slides for guiding the motion of the tools in a straight line and a lever for actuating the tools. Such fixtures often have two tools moving in opposite directions, the slides being operated by an arrangement of rack and pinion or merely by links attached to the hand lever. As the quantity of metal to be sheared off is small, very little effort is required to move the lever.

Subsequent to cleaning, castings are always given a final inspection and are then either packed for shipment or are delivered to a local finisher for plating or other finishing work. Because of the excellent natural finish of the castings, there is a minimum of polishing or other finishing operations and finishing costs are correspondingly reduced.

The shop has a well equipped toolroom where all its own dies and cleaning tools are produced. Dies are made from Latrobe ZT steel, with core and other pins of Lustrite stainless steel drill rod. Both these steels are produced by the Latrobe Electric Steel Co., Latrobe, Pa. Die surfaces subject to mechanical wear are hardened by cyanide treatment so that upkeep expense is minimized and dimensional limits are readily maintained. A section of the toolroom is shown in an accompanying illustration, on Page 39.

The Schultz shop is not only well equipped, but is operated under such a policy and in such a manner as to assure a product of high grade. This has resulted not only in satisfied customers and constant repeat orders, but in a deserved reputation which has brought new business as well as fair profits. In short, the history of the shop is what might be expected in the case of conservative shops which are at the same time progressive, well planned and equipped, and well managed.

Utility of Carbide Residue Described in Booklet

How owners of acetylene generators may capitalize on their carbide residue is explained in a 20-page booklet entitled "The Utility of Carbide Residue," recently published by the Linde Air Products Co., 30 East Forty-second street, New York, and available upon request.

The booklet tells how carbide residue can be used as the principal ingredient in whitewash, fireproof cement, mortar, plaster, concrete or stucco. Formulas and hints for the preparation and utilization of these various covering agents and construction materials are given. Industrial uses of the residue as an oil and dirt scavenger, as a cleaner for drainage pipes, as a brake and clutch dressing for machinery, and as an ingredient in boiler lagging are described. Among the agricultural uses of carbide residue for which directions and formulas are given are: Spraying plants and orchards, killing insects, correcting soil acidity, improving soil tilth, preserving wooden fence posts, and disinfecting and deodorizing farm buildings.

Industrial Lubrication Council Is Organized

In response to a demand for some organized method of supplying authentic information on industrial lubrication problems, there has been established the Industrial Lubrication Council Inc., 51 East Forty-second street, New York, a non-profit organization for educational purposes.

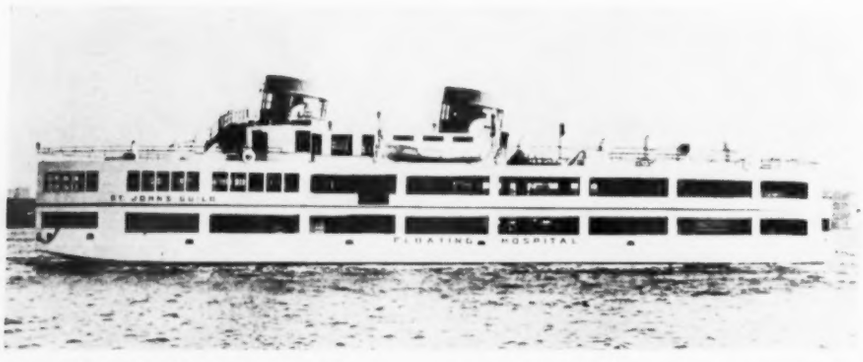
From the past six years of activity of the lubrication engineering committee of the Machine-Shop Practice division of the American Society of Mechanical Engineers, it has become evident that a special type of lubrication-engineering education for industry would be necessary. The trend now is for these industries to assign certain staff engineers as lubrication engineers without these men having had proper and standardized training for that work. This new council is the direct result of this necessity for education and training on a national basis.

Assisting in this work of the council is an advisory board of 133 members representing every phase of lubrication from the consumers' standpoint, including research men, oil-application technicians, lubrication specialists now employed in industry, machinery design and building experts, makers of bearings, chemists, economists, analysts, and also many deans and professors in various technical schools.

There has been prepared a standard textbook or course of instruction in lubrication engineering for the technical and trade schools, colleges and universities so that engineering students can be properly trained for future employment in this newest branch of mechanical engineering.

These advantages will be extended to engineers who are now employed in plants and shops of industry. This will be done through a correspondence instruction course along with a regularly issued series of information bulletins on the latest practical developments in the many subjects covered by "lubrication," and finally by a handbook of 45 chapters.

Floating Hospital



ALL-WELDED HOSPITAL SHIP, reported to be the largest of its type ever built, recently delivered by the John H. Mathis Co., Camden, N. J., to St. John's Guild, New York. Providing accommodations for 1550 passengers and crew, the vessel is 181 feet long, 49 feet beam and 11 feet molded depth. The hull is divided into 25 water-tight compartments and has three decks. Use of arc welding allowed the builder to employ bent plate construction, only a small percentage of shapes being required. Approximately 90,000 linear feet of welding went into the building of the vessel; it was done with shielded arc equipment supplied by Lincoln Electric Co., Cleveland

A New Design in Automatic Mechanical Gas Producers

BY A. E. GIBSON
Vice President, Wellman Engineering Co., Cleveland

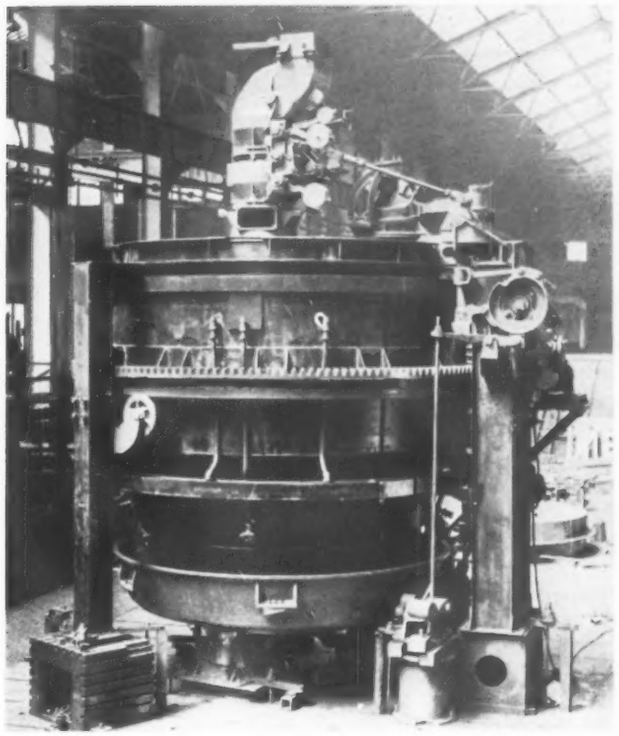


Fig. 1—Automatic gas producer featuring high capacity, automatic operation and alloy steel construction. This is one of nine producers which will furnish fuel for reheating ovens at a continuous sheet mill

IMPORTANCE of welded, low-alloy high-tensile, corrosion resistant steel in the design of modern equipment is exemplified in the new, high capacity, automatic gas producer recently built by the Wellman Engineering Co., Cleveland. This equipment clearly portrays the progress of engineering design in the past quarter century. From a crudely designed mechanism with exposed cast tooth gearing, with inefficient blast, producing uneven fire zones and excessive clinkering, with gasification capacities of less than 1800 pounds of coal per hour, these machines have, over a period of 20-odd years, been developed to the present modern design.

The producer shown in Fig. 1 incorporates not only the latest developments in materials, but also modern and efficient design which gives a gasification rate almost 400 per cent greater than the mechanism which introduced the first stages of automatic producer gas making. Incorporated in the new design are such features as totally enclosed double reduction worm gearing, with bronze worm wheels and hardened and ground worms mounted on antifriction bearings.

The main gear, 14 feet in diameter and shown in Fig. 3 having the teeth cut on a 16-foot diameter gear cutter, is of 0.50 per cent carbon cast steel. The supporting roller track, tongued to the gear, is also of 0.50 carbon steel, and rolled from 4 x 4-inch steel. The joint is at an angle of 45 degrees, eliminating the possibility of flat spots in operation.

A dual system of steam jet and turboblower is provided, interchangeable in a few mintes time. The dual system assures uninterrupted gasification should either system cease to function.

The water-cooled shell, of Cor-Ten (United States Steel Corp.) steel, is of all-welded construction, and is designed for ample water circulation, thus eliminating the necessity for lining. Rollers supporting the shell and ash pan are of hardened tread. The former, mounted in pairs in an equallizer, provide three-point suspension with low bearing pressures. From the standpoints of capacity, control of product, and low operating and maintenance costs, this new machine

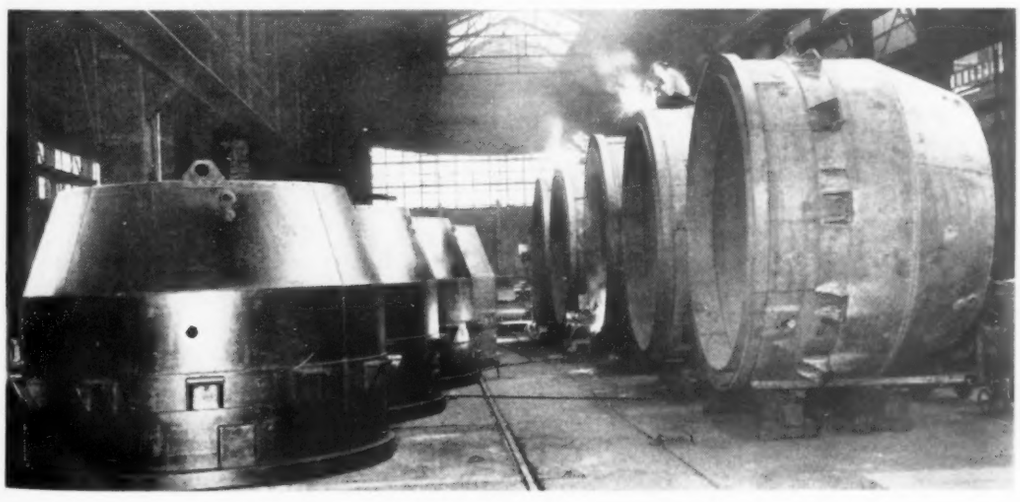


FIG. 2—Nine water-cooled gas producer shells, constructed of low-alloy high-tensile steel, completely welded

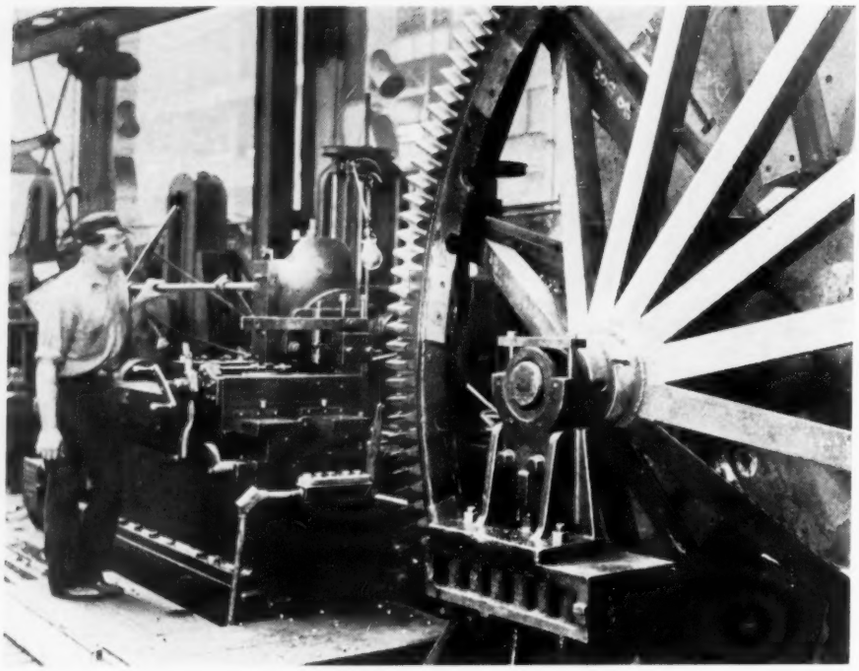


Fig. 3—Cutting the teeth in the 14-foot diameter cast steel main producer gear. Note the holding fixture of welded channels and angles

is far superior to any heretofore designed.

This new gas producer is the product of the combined experience of Wellman engineers and that of operators in industries which for many years have had under their supervision the making of producer gas for use in the steel, glass, brick and ceramic industries.

No Brick Lining Needed

One important feature is the water-cooled shell, which eliminates the necessity for firebrick lining and prevents the adhesion of coal and ash to the side wall. The omission of brick lining permits a larger diameter, thus increasing the square footage of fire zone and capacity of gasification. Starting with a rolled steel of low-alloy content, having a yield point of approximately 50,000 pounds per square inch and an ultimate strength of 75,000 pounds per square inch, with excellent qualities of ductility, the water-cooled shell was designed of lighter section than would be required with low-carbon steel. In addition, the steel used was of high phosphorus content which gives a resistance to corrosion four to six times that of unalloyed low-carbon steel. All the welds were of complete penetration, reinforced to make them thicker than the parent metal, and all the welding was done with heavily coated metal electrodes. The value of heavily coated electrode welds in resistance to corrosion is well known and it is expected that the life of the reinforced welds will at least be equal to the parent metal.

In the fabrication of the shells, care was taken to maintain the diameters called for. This was accomplished by taping the circumference of the shells before making the longitudinal weld, and then rounding the shell by use of spiders, as shown in Fig. 5. The conical shell plates were rounded to shape by means of straps and bolts (see Fig. 4), a quick method of alignment.

Nine water-cooled shells under course of fabrication are shown in Fig. 2; the brackets welded at the center of the shell support the rotating gear. These brackets were attached to the shell with the gear properly aligned, and the bolt holes in the brackets were drilled directly from the gear, thus insuring concentricity of the gear and shell. The shell is provided with two water troughs at the top. The smaller outer trough is for fresh clear water, and the larger, inner trough is for the gas seal between the revolving shell and stationary top. Ample provision is made for cleaning out deposits of tar and ash settling in the water seal and piping.

Seek To Avoid Cracks

The water-cooled, rolled steel, welded top plate is shown in Fig. 6. Subjected, as the top plate is, to high temperature on the one side and water cooling on the other, welded construction has produced a product which eliminates the danger of cracks.

Another innovation is a centralized lubrication system. With a single application, all moving parts are lubricated at once, thus effecting not only a great saving in labor and lubricant, but assuring correct oiling of all parts without having to rely on the memory of an oiler. This method of lubrication is the same as that used on many of the ladle cranes, rolling mills, and other modern equipment in the steel industry.

The patented Wellman coal feed, located on the top plate, is actually gas tight and is automatically controlled for quantity to maintain a constant gasification rate. In principle, it is the same as the double bells of a blast furnace, one bell being closed while the other is open. The seats and bells are of high-

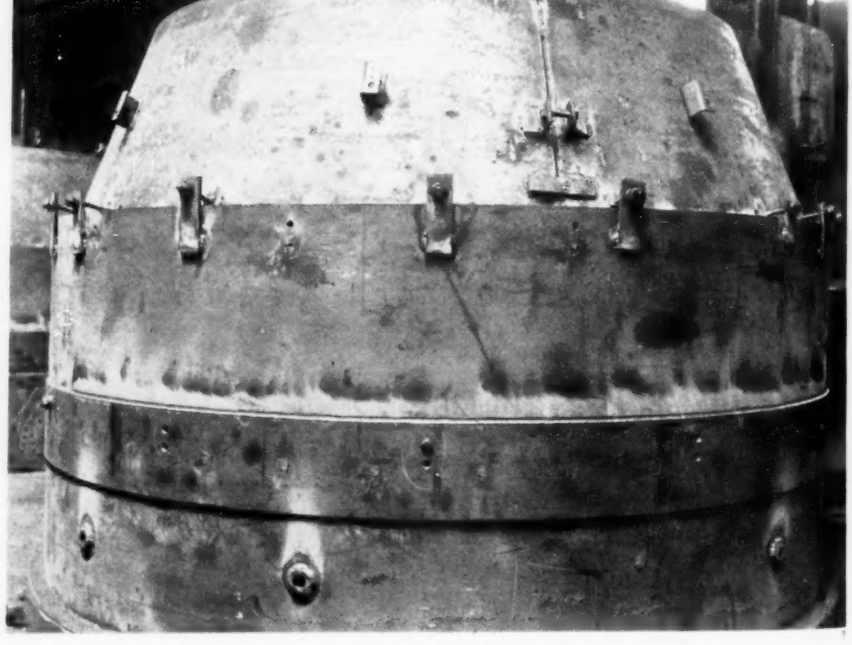


Fig. 4—Straps welded to the cylindrical shell and bolts welded to the conical shell are used to align the two parts correctly for welding

chromium, nickel steel castings, which insure long life and nonwarping under heat. By simply turning a handwheel, the rate of feed may be changed quickly from zero to maximum capacity.

Another innovation is the new water seal installed under the ash pan to prevent escape of the blast around the blast intake. This is a simple arrangement of baffles attached to the ash pan, rotating in water. The depth of the baffle is sufficient to maintain the seal under any pressure encountered during the operation of the producer.

Uniform Ash Removal

Efficient automatic ash removal is provided, as well as an automatic poker which keeps the coal bed uniformly level and provides the proper amount of agitation to prevent clinkering and to allow free escape of the gas through the entire fuel bed. The path of the poker, as it swings from the center to within 3 inches of the shell wall, is timed to repeat its cycle in several hours, there being about three trips from the center to the outer wall during one revolution of the producer shell. Automatic and periodical stoppage of the ash pan is provided to shear the ash bed three times in each revolution of the shell. This action breaks up the ash bed, prevents hanging of the ash to the shell, and permits uniform ash removal—important functions of uniform gasification.

All mechanical operations, rotation of the shell, poker and coal feed drives, and stoppage of the ash pan, are performed by one 5-horsepower motor directly connected to the worm reduction, mounted on the main machinery column.

The producer has a gasification rate of 6000 pounds of bituminous coal per hour continuously, with a short run maximum capacity of 7500 pounds per hour. The objectives sought in this design were:

(1) Maximum capacity of gasification with the minimum operation expense, and

(2) An upkeep cost which would justify the use of the high strength, light weight, corrosion resistant steels, and long life materials used in the moving and wearing parts.

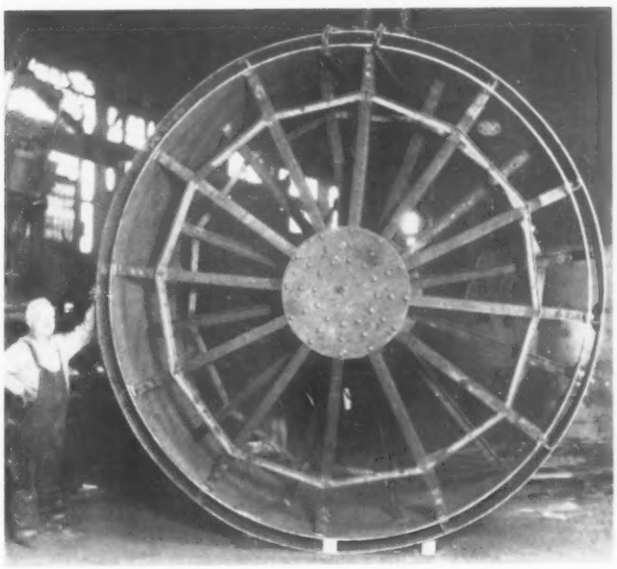


FIG. 5—Spiders in the inside of the shell are used to maintain the correct diameter during the welding operation

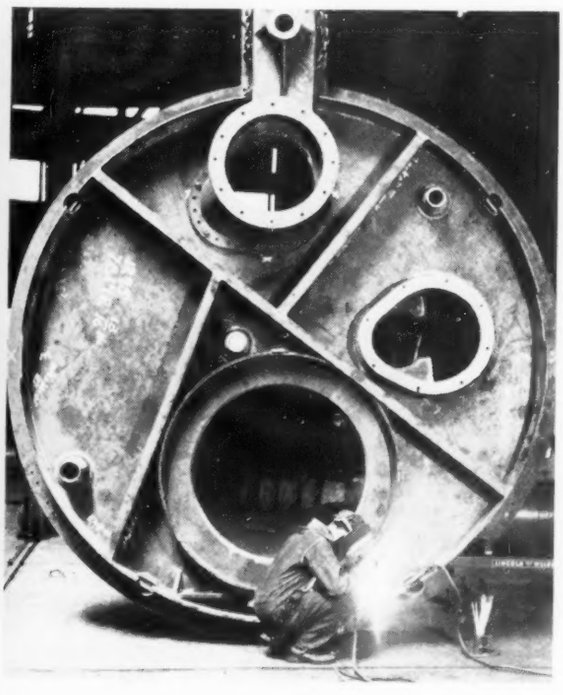


FIG. 6 — Welded steel top plate for gas producer. The coal feed base and three poke hole frames are of cast steel welded to the plate. The cast iron poker support at the top of the illustration is riveted in place

Announces a New Type of Cord Transmission Belt

A new and superior cord transmission belt is announced by the mechanical goods division of United States Rubber Products Inc., 1790 Broadway, New York. Tradenamed U. S. Royal Cord belt, it is the outcome of improvements and refinements of the present cord belt with its encasing duck envelope. It is said that the new belt will meet the whole range of transmission problems.

The most striking characteristic of the belt is the square cut edge, in which respect, as well as in its coloring of mahogany with blue edges, it resembles the company's duck belt. Because the cords are embedded in rubber, the cut edge is claimed to stand up exceptionally well when run against shifters. The laminated cut edge construction permits the use of a single ply of duck on each side.

The manufacturer has developed a special duck to eliminate the many seams necessary in a bias cut duck cover. Only one cover joint is required and an improved method of making this joint has been developed. The new belt is available in widths up to 24 inches and in plies from 5 up. Accomplishment of a flexible, light, nonstretching cord belt in 5 and 6 plies, as well as a stronger, heavy belt for rugged and severe drives in heavier plies, enables the new product to meet all services from planer belts to the heaviest oil field types.

Malleable Castings Users Should Supply Data

"Data Required for Estimation of Costs" is the title of a pamphlet prepared by the Lake City Malleable Co., Cleveland. It sets forth in detail the kind of information which should be supplied by users of malleable castings to the foundries which furnish these castings. The purpose of the pamphlet is to promote co-ordination between the foundry and the user which will result in the production of satisfactory castings.

Ordinary steel foundry practice and green sand facing are used in the production of iron gooseneck castings

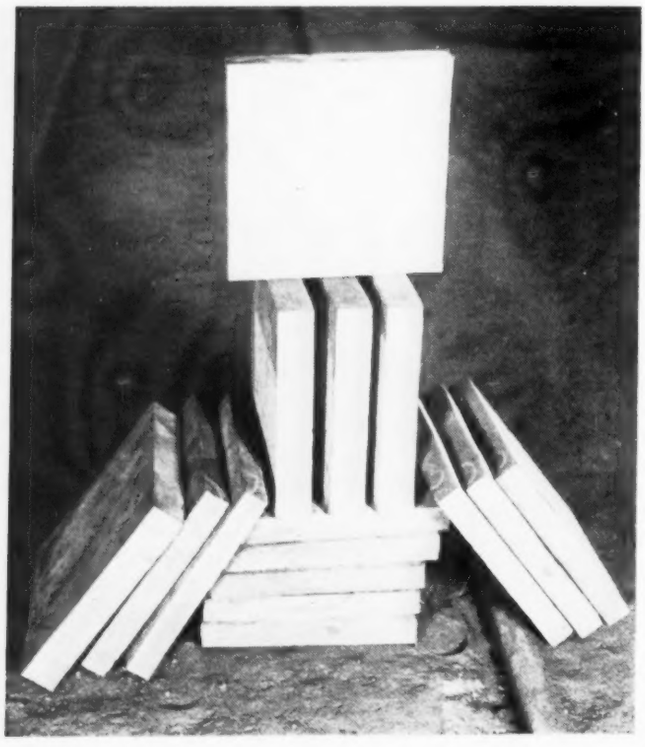
Produces Wide Range of Iron Castings in Steel Foundry

BY WILLIAM F. ROSE

CASTINGS shown in the accompanying illustrations are typical of a widely diversified line of high test and alloy irons molded and cast in a steel foundry. Green sand facing and regular steel foundry practice are employed in the production of these castings. Over a period of three years this method has been applied to small and large gear blanks, die blocks, dampers, pots, cylinders, pressure kettles, goosenecks and other miscellaneous castings. Nearly all these castings had to be machined and were subjected to pressure, impact and heat treatment.

Molds are made according to accepted iron foundry practice in which the molds are blacked and skin dried with a torch. The principal advantage of using steel foundry facing sand is that the mold becomes practically foolproof with a permeability of 325. No venting with a wire is necessary and the mold is rammed as hard as would be necessary for the reception of steel. The resulting casting is true to pattern and presents none of the overweight which follows soft ramming. Hard ramming also prevents runouts. The mold face does not cut or scab.

Castings are clean and smooth and present a dark blue surface when shaken out, but as a result of thorough pressure blasting are almost white when ready for shipment. Large iron castings up to 5 tons have been made in green sand molds by steel foundry molders. Steel and iron castings are shaken out over the same grating, since the same sand is reclaimed, reconditioned and used either for steel or iron casting molds. This arrangement and method of procedure greatly simplify the daily operating routine. A single sand handling unit takes care of all requirements where two would be needed under ordinary conditions.



HARD ramming and highly permeable sand produce clean, sharp corner iron castings

Pioneer Work on Pressure Data for Press Operation

Press Work Pressures, by C. W. Lucas; cloth, 128 pages, 8¼ x 10¾; published by McGraw-Hill Book Co. Inc., New York; supplied by STEEL, Cleveland, for $4, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

The author is die and automatic equipment engineer of the Ferracute Machine Co. and a member of the American Society of Mechanical Engineers. The purpose of the volume is to guide the mechanical engineer in estimating the size of press required for a given job. In need of such information 20 years ago, he found a dearth of published material and started at once to accumulate data bearing on the subject. More than 1000 tests have been classified according to the operation, material, shape and size of the piece so that ready comparison can be made with the work in hand.

After ten years in positions involving checking of calculations made by others he found general lack of knowledge concerning the subject, as no other book has been printed bearing on this phase of machine work, and this volume is the result.

Subjects covered include coining, drawing, embossing, forging, forming, hook seaming, curling, punching, shearing, hollow cutting, sprue cutting, riveting and others. Ample illustrative diagrams are provided and the text is concise and comprehensive.

POWER DRIVES

Bearings in Hot Places

Ball bearings on the trolleys supporting the chain and loads in an electric japanning oven of the continuous conveyor type had been failing in service due to the difficulty, practically the impossibility, of maintaining lubrication because of the high temperature. These bearings were not subjected to direct heat, being protected somewhat by a trough or groove in which they were carried; however, they were operated in temperatures varying from about 700 degrees Fahr. to that of the room. No lubricant is used since none would stand up under such service.

For some time the engineers of both manufacturer and user believed that the bearing trouble resulted from failure of the balls and resulting fracture of the bearing cage as always both were fractured and often the ball was pulverized. Substituting balls of heat-resisting alloys did not solve the problem.

On the theory that perhaps the cage became distorted due to the high temperature and failed, and that fractured parts of the cage would then jam and pulverize the balls, the cage was made from a special heat resisting alloy. After trials with several alloys a metal cage has been found which operates very satisfactorily under these unusually severe conditions.

• • •

Power Drive Costs

Tests made on several lineshaft drives in an eastern metalworking plant indicated that they lost about 2 per cent of the entire power load. Additional losses from creep and other factors difficult to measure were estimated at 1.5 per cent more or a total of 3.5 per cent of the power bill.

Estimates of power consumption on this same group of machines, if unit driven, showed a decrease in motor efficiencies of an average of 12.5 per cent below that of the group drive motors because individual motors usually operate at approximately 40 to 65 per cent of full-load rating compared with 75 to 90 per cent on group drives. This gives an operating efficiency advantage of 9 per cent to the group drive.

In addition, in this same plant, the low load factor of the unit driven motors would have added a power factor penalty of 26.8 per cent. This, with the increased consumption because of the inefficiency of underloaded motors over group drive losses, would have increased the power bill by 35.8 per cent. Also, the annual fixed charges, which are based on original cost installed, and maintenance expenses, added to the increased cost of power would have considerably more than doubled the annual operating costs, a high premium to pay for individual drives in these days of keen cost competition.

• • •

Protect Repair Parts

The only purpose of carrying a stock of extra bearings and other repair and replacement parts for transmission equipment and power distribution and control units is to decrease the time out for emergency replacements. However, unless the used parts are promptly restocked and protected from damage during storage, repair parts stock is of little real value.

Sometimes parts may be carried in stock for several years before they are needed. Unless protected from corrosion or rough handling they may become so badly damaged as to be useless. For example, one plant purchased a set of extra armature coils for a special motor driving an important machine, because if this motor failed it practically shut down the plant. When the emergency came a few years later, the plant engineer found that these coils had been "pushed around out of the way" so many times that the insulation on several of the coils was badly damaged. Testing out and emergency repairs to these coils kept the motor down for an extra day. Delicate parts should receive a minimum of handling and also be protected from dust and moisture.

In another plant an extra antifriction lineshaft bearing waited on the shelf for years. Finally, when it was taken out to put on another new installation, the engineers discovered that a leaking radiator valve had rusted the bearing to junk. Repair parts with finished surfaces require periodic inspection and should be reslushed if necessary. Moisture and neglect can do a lot of damage in a short time.

• • •

Lubrication Assurance

How can the transmission engineer be sure that the oiler does his work? This has always been a problem. As a solution a contributor to Vol. 1, No. 11, *Power and Transmission*, issued in Mishawaka Ind., in August, 1886, suggested the following ingenious plan:

"To insure attention to all oil holes and the neglect of none provide two plugs, one with a round head, the other with a square head, for each hole. Assume that on Monday all holes have the plugs with round heads. The oiler removes these and inserts the plugs with square heads; the next day he changes back to round heads, and so on. If there are 400 oil holes he must be able to show 400 of the round plugs, or the square plugs, after oiling."

The editor in commenting stated that the only thing against the plan was that the oiler would be more sure of changing the pins than filling the oil holes. [Also, who would count the pins daily, and might not the oiler keep out both pins on some of the holes in the most dangerous locations or those difficult of access].

In those days any green hand was given an oil can because the importance of good lubrication and the danger were not appreciated. In the modern shop of today proper lubrication is one of the most essential protections against interruption or failure of operation. Instead of leaving lubrication to chance transmission engineers establish assurance that it will not be neglected today by depending upon the following:

1—Make the work safe for the oiler.

2—Use bearings which require only infrequent or periodic lubrication, or provide automatic lubrication with frequent checks against interruption.

3—Employ only competent, reliable and trained men for this important work.

• • •

There is seldom any excuse for interruptions to production because of drive trouble. Practically all trouble discloses some indication ahead of actual failure.

• • •

Over-lubrication may be more serious than under-lubrication.

• • •

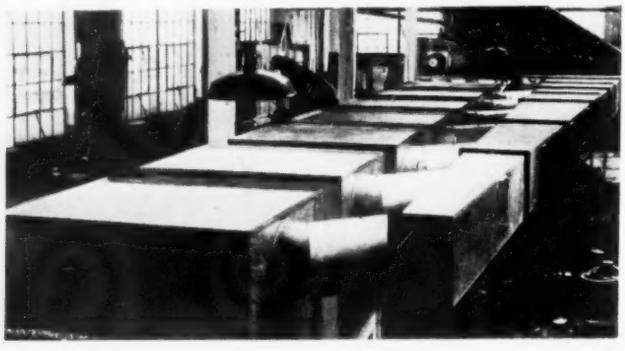
Improper starting may do more damage to a drive than months of service.

METHODS AND MATERIALS

Central Water Washing Chamber

INSTEAD of installing one water wash chamber for each spray booth, the Binks Mfg. Co., 3114 Carroll avenue, Chicago, recently designed for an eastern enameling plant a central water washing chamber to serve a battery of seven ceramic spray booths. Shown in the accompanying illustration, each of the seven booths is used to spray different colors of porcelain enamel. The water wash chamber on this job was installed in order that no foreign materials might escape into the air. No attempt was made to provide for reclaiming because of the different colors used in each booth. Other water wash booths built by this company serve not only to purify the air but to reclaim the porcelain frit as well.

To obtain the necessary air velocity to properly exhaust the spray fumes, an enormous 7½-horsepower exhaust unit is furnished. To equalize the exhausting velocity at each booth it is only necessary to stagger the position of the dampers at the back of each booth. The nearest one to the exhaust unit is left practically closed while the one farthest away is left wide open. The central type washing chamber for a series of booths is adaptable to ceramic type spray booths but has not yet been found to work out satisfactorily where synthetic enamel is sprayed.



This central washing chamber serves a battery of seven ceramic spray booths

S S S

Individual Lamps Improve Turret Lathe Lighting

In connection with a recent program of modernizing illumination in its offices, the Warner & Swasey Co., Cleveland, directed some attention to improving lighting in manufacturing departments. On one floor of the factory is a department in which is located a battery of 20 turret lathes turning out some of the more exacting lathe work. Much of this work demands that parts be turned to extremely close tolerances, thus a high intensity of light is required.

Since the general illumination in this department is sufficient for the ordinary work of the department, it was decided to bring the illumination directly to the point where the finer work is done. That called for providing individual lamps on each of the machines in such a manner that the light would fall directly on the work.

Because the machines were wired for 220 volts, it was thought desirable to place a small transformer on each machine to step the current down to the 110 volts for lighting. From this transformer a flexible cord was run to the lamp socket which is mounted on an adjustable lighting fixture. This makes it possible to support the lamp in any desired position.

The lamps used in these individual reflectors at present are only 50 watts, but because of their nearness to the working point a total of approximately 50 foot-candles of light is provided on the parts being machined.

By mounting the individual transformers on each machine the necessity for running a separate lighting circuit to the machines is eliminated and the lighting fixture with its small transformer becomes an integral part of the machine. Furthermore, new lighting wiring and layout will not be required if the machines are moved.

S S S

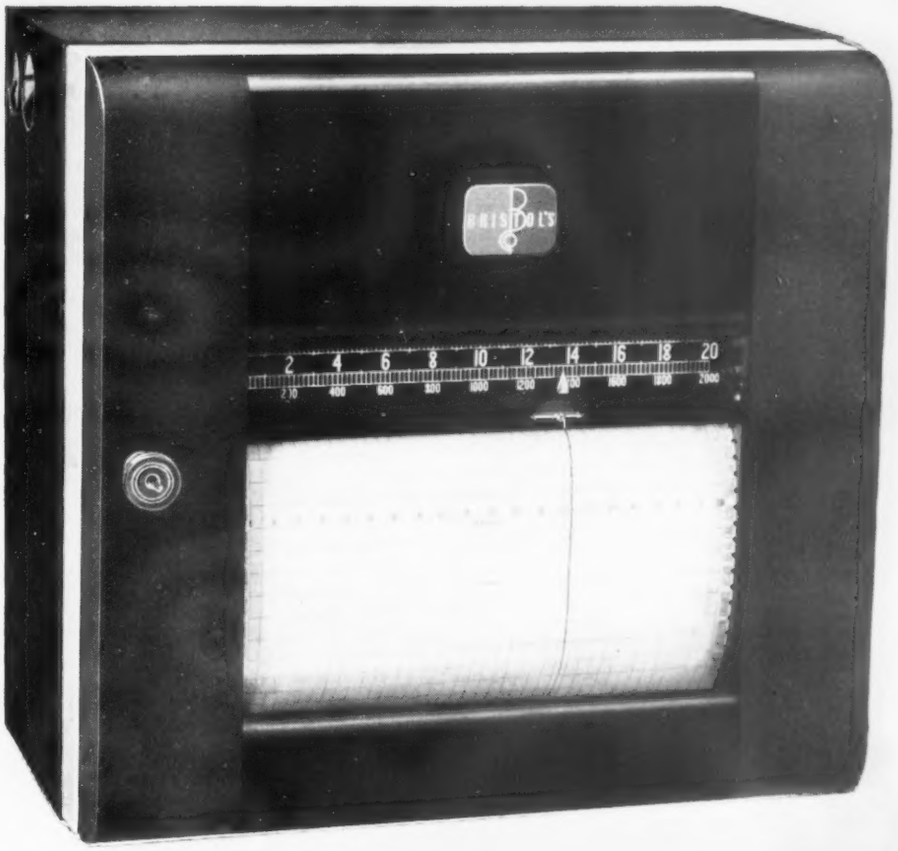
Tellurium Alloyed Lead Gains New Properties

Tellurium lead, the new type of lead developed recently, possesses all the characteristics of ordinary lead and has some new and valuable properties in addition. The unique qualities of the new material are obtained by the addition of less than 0.1 per cent of the somewhat rare metal tellurium which produces a marked change in the physical structure and causes the grain formation to be extremely fine and uniform. This addition produces a lead of greater resistance to corrosion by acids, greater tensile strength, and greater resistance to fatigue resulting from vibrations or repeated stresses. The material also has better working qualities.

Tellurium lead pipe, for example, when used for conveying water, ex-

Presenting

a masterpiece of pyrometer achievement



THE most notable advance in years in pyrometer construction, this new Bristol's Wide-Strip Potentiometer Pyrometer reflects throughout the touch of master craftsmanship. From the handsome lustrous case designed by one of the country's foremost industrial artists to the super-sensitive yet heavy duty galvanometer of Weston precision, quality prevails.

This latest achievement by the pioneer builders of pyrometers sets a new standard in the art of high temperature measurement by the potentiometer method. It possesses a surprisingly simple mechanism,—for measuring, balancing and recording. Although of fine accuracy, —it welcomes hard service.

Little care is needed as all principal shafts are equipped with ball bearings. Because the recording pen and slide wire contact are mounted integrally, and since friction clutches and ratchets are not used, back lash and lost motion are eliminated. Simplicity throughout assures long life with a minimum of service.

BRISTOL'S WIDE-STRIP POTENTIOMETER PYROMETER CHALLENGES COMPARISON. Its unique method of maintaining emf balance and of magnifying scarcely perceptible deflections, its speed of response, AUTOMATIC STANDARDIZING, the unusually wide chart, and extra large indicating scale, all deserve your closest attention.

Catalog No. 1450 contains the details you will be interested in. Write for a copy.

THE BRISTOL COMPANY · WATERBURY · CONNECTICUT

Branch Offices: Akron · Birmingham · Boston · Chicago · Denver · Detroit · Los Angeles · New York · Philadelphia · Pittsburgh · St. Louis San Francisco · Canada: The Bristol Company of Canada, Ltd., Toronto, Ontario, England: Bristol's Instrument Co., Ltd., London, S. E. 14

BRISTOL'S

WIDE-STRIP PYROMETER

hibits greater resistance to bursting after repeated freezing. When used for roofing and in the chemical industry, the new alloy in rolled sheet form exhibits a degree of freedom from wrinkling and buckling before unknown.

Lead alloys, hardened with alkaline earth metals, are coming to the fore particularly for use as bearing metals.

s s s

Process Gives Steel the Appearance of Marble

Steel has been given many disguises in its career; it may be made to look like a mahogany or walnut panel or a plaster wall with equal ease. Only recently, however, has steel been made to look like a slab of marble or a Gobelin tapestry, according to a recent issue of *Steel Facts*, published by the American Iron and Steel institute, New York.

This new finish is obtained either with ordinary photographs or with decalcomania, the latter being those colored "transfer pictures" familiar to every boy. To make this versatile material, terne plate is heated almost to the melting point of its coating of lead-tin alloy. Then a thin layer of felt or other fabric is pressed into the softened alloy surface. Immediate chilling keeps the fabric from being charred.

A photograph or colored decalcomania of whatever is to be "steelized" is laid on this fabric surface, saturated with resin and baked under pressure. The result is a laminated sheet of steel, terne alloy, felt, and resin-impregnated paper. The sheet has steel's strength, but it does not look, feel nor sound like steel.

This new material has been suggested for furniture, interiors of office buildings, store fronts, radio cabinets, and other applications where steel's strength and low cost are advantageous, and where the appearance of marble, various kinds of woods, or any colored finish is desired.

s s s

Materials for New Fan Were Selected Carefully

A new 8-inch electric fan developed by Victor Electric Products Inc., Cincinnati, known as the Silver Streak, is constructed of carefully selected materials. Motor end plates are formed from deep drawing cold rolled steel. Motor laminations are of 1½ per cent silicon electrical steel. The shafting is of spindle steel. Bearings are of the oil and graphite impregnated type; the company states that in four years of experience with such bearings it never has had to replace a set due to wear. The fan is finished with a hard, glossy lacquer.

s s s

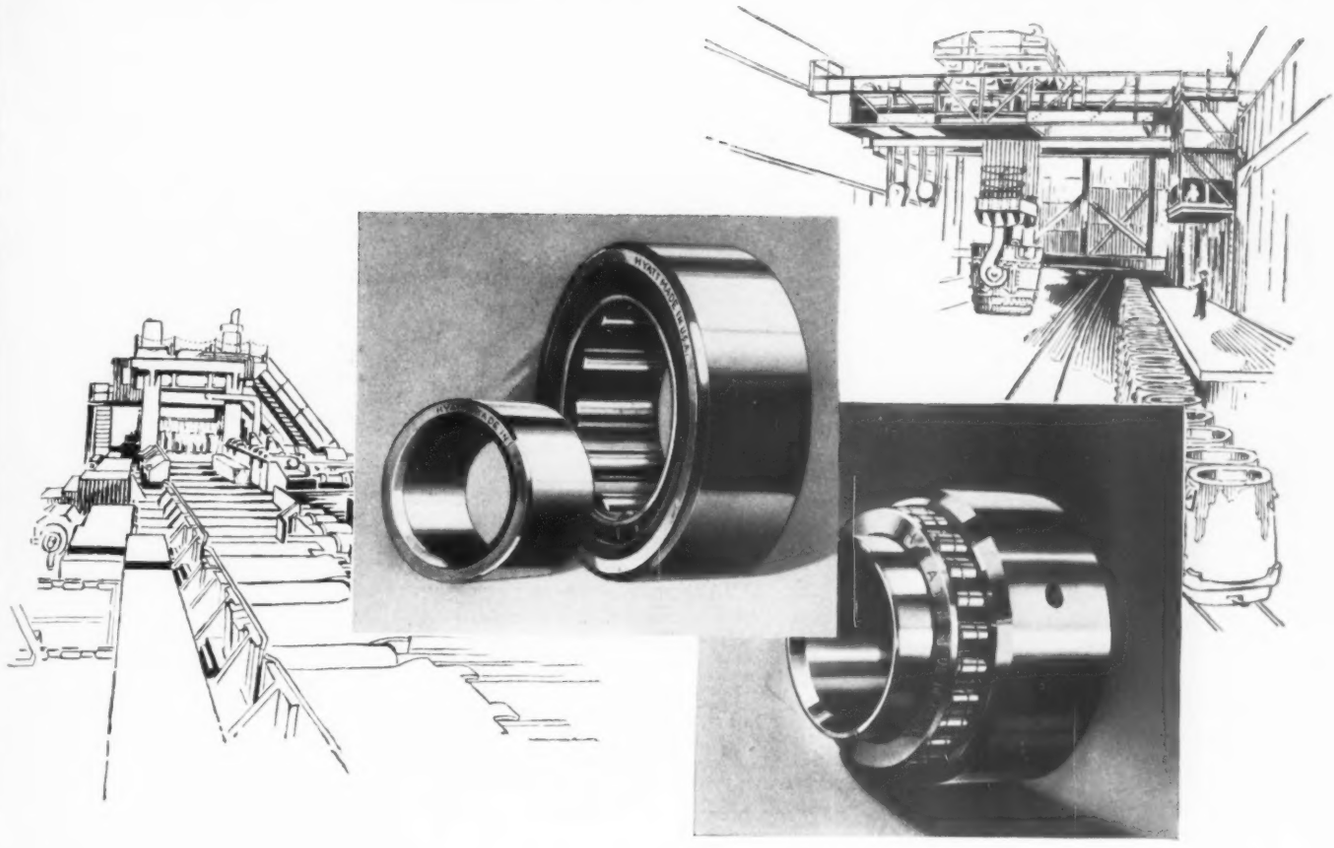
Boiler Has Hot Water Coil Of Unusual Capacity

Fitzgibbons Boiler Co. Inc., 570 Seventh avenue, New York, now celebrating its fiftieth anniversary, recently developed a domestic heating boiler with an unusual feature. It is equipped with a hot water coil of sufficient capacity to furnish an adequate supply of hot water, summer and winter and 24 hours a day, without the necessity for installing a storage tank.

Known as the Tanksaver, this is an electrically welded, tubular fire-box boiler, made of copper-bearing steel and designed exclusively for oil burning in residential installations. The new boiler is one of eighteen different fabricated steel products made by this company.

Stainless Steel Finds New Uses

COMBINING appearance and serviceability, stainless steel is proving the answer to many of the designer's problems. The accompanying illustrations shows a few of the achievements in stainless steel by Helen Hughes Dulaney, prominent industrial stylist, Chicago. Above she is shown inspecting the complete stainless steel table service which she designed and fabricated for the Zephyr trains of the Burlington railroad. To the right is a stainless steel coffee service in the jungle room of her penthouse apartment. Mrs. Dulaney's forte is designing interior furnishings varying from kitchen ranges and vacuum cleaners to costume jewelry for the ultra-sophisticated woman. More and more of the articles coming within this broad classification are being made of stainless steel. Her recent creations include stainless steel vases, trays, ash trays, cigarette boxes and different kinds of service plates. From the standpoint of fabricating qualities she has found few limitations in adapting stainless steel to her designs.



More Hyatts and More Tonnage

As production increases, outworn and obsolete equipment goes into the discard. Modern efficiency and economy of operation necessitated by the new order of things demand new equipment.

Steel plants have been busy during 1935 applying more Hyatt Roller Bearings as changeovers in their existing equipment and as integral parts of their new equipment purchases.

Hyatts are specified to insure longer equipment life . . . less bearing wear and care . . . more tonnage.

It's superfluous to tell you how well these better bearings are designed and built . . . you know from experience. Hyatt Roller Bearing Company, Newark, Detroit, Chicago, Pittsburgh, San Francisco.

H Y A T T

ROLLER BEARINGS

PRODUCT OF GENERAL MOTORS

Electric Water Heater Utilizes New System of Heat Transfer

AN ELECTRICALLY controlled steam water heater, utilizing a new system of heat transfer together with a new method of control and requiring no valves or other moving parts in the heat-transfer system, has been developed by the General Electric Co., Schenectady, N. Y. Although the device has not yet been placed in production, installation tests have shown promising results.

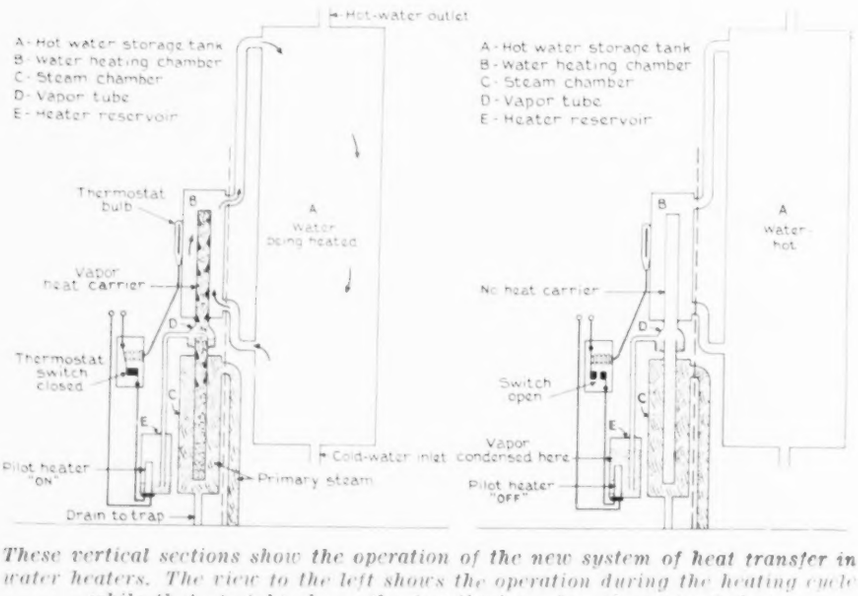
The operation of the device is unique in that no steam-regulating valve is used. The heat from the steam is released to the water by means of an hermetically sealed heat-transfer system which utilizes water vapor as the heat-carrying medium. The water vapor can be put into or removed from operation by an automatic electric means. In effect, heating is controlled by inserting or withdrawing the medium carrying the heat from the steam to the water; thus the release of heat from the steam rather than the steam flow itself is regulated.

The water heater is compact in size and simple in operation. It is made up essentially of three parts, a steam chamber, a water-heating chamber and the heat-exchange system. The steam chamber and the water-heating chamber, both cylindrical in form and both well insulated, are separated from each other, with the latter located directly above the former. Running between the two and extending well into them is a vapor tube, sealed at both ends but having a connection near the middle, between the two chambers, from which a pipe runs to an externally located, uninsulated heater reservoir. The vapor tube and heater reservoir comprise the heat-transfer system, which contains no air and is hermetically sealed.

In the heater reservoir is a small amount of water and a cartridge-type electric heating unit. The system is arranged so that, when the heating unit is turned on and the water in the reservoir is heated sufficiently, vapor pressure forces the water up the pipe connected to the vapor tube. When the water strikes the hot part of the vapor tube extending into the steam chamber, it is flashed into vapor which rises into the cool part of the tube extending into the water-heating chamber. There the heat is given up to the water and the condensate runs back down the tube to be revaporized and to repeat the cycle, which is continuous until the water to be heated reaches the desired temperature.

Shuts Off Automatically

When the water has been heated to the required point, a thermostatic switch turns off the heating element in the heater reservoir. With the heating element off, the reservoir, being uninsulated, soon cools and the vapor pressure within it is correspondingly reduced. Thereupon the condensate from the water-heating chamber, instead of returning to the steam chamber to be revaporized, is permitted to run back into the heater reservoir. Thus the heat carrier is removed from the vapor tube and no heat can be transferred from the steam chamber to the water-heating chamber. For this reason the water in the upper chamber is not heated until the thermostatic switch turns on the heating unit and starts the whole process over again.



These vertical sections show the operation of the new system of heat transfer in water heaters. The view to the left shows the operation during the heating cycle while that at right shows the functioning when the water is hot

A.S.M.E. Lists Meeting Program

AMERICAN Society of Mechanical Engineers has announced the tentative program for its annual meeting to be held at the Engineering Societies building, New York, Dec. 2-5. Sessions of interest to the iron, steel and metalworking industries, have been arranged as follows:

Tuesday, Dec. 3

MORNING

Machine Shop Session

"Desired Characteristics of Surface Finishes," by J. E. Kline.

"Steel Plate Structures Versus Cast Iron," by R. T. Hazelton.

Symposium on Effect of Technological Changes on Human Relations

"The Place of Skill in Industry," by Dr. Lillian M. Gilbreth.

"Human Problems as Created by the Introduction of Labor-Saving Machinery," by Prof. Elizabeth F. Baker.

"What Is the Effect on Employes of Technological Changes?" by Prof. M. S. Vitales.

"Development of Physiological Efficiency and Maintenance of Health When Introducing a Technological Change," by Dr. H. W. Haggard.

"Methods of Introducing Technological Changes," by C. S. Ching.

Mechanical Springs Session

"Maximum Shearing Stresses in Eccentrically Loaded Helical Springs of Circular Wire," by Prof. H. C. Perkins.

"Correlation of Spring Wire Bending and Torsion Fatigue Tests," by E. E. Weibel.

"Report of Fatigue Tests on Helical Springs."

AFTERNOON

Creep of Metals Session

"Design Aspect of Creep," by R. W. Bailey.

"A Method of Analyzing Creep Data," by R. G. Sturm, C. Dumont and F. M. Howell.

"Creep of Metals," by A. Nadai and E. A. Davis.

"Residual Stresses in Cold Drawn Brass Tubes," by C. G. Anderson.

Wednesday, Dec. 4

MORNING

Occupational Disease Session

"Additional Responsibility Placed Upon Industry by Recent Occupational Disease Legislation," by H. D. Sayer.

"Engineering Control of Occupational Disease Hazards," by Warren Cook.

"Limitations of Protective Devices and Equipment," by Prof. Philip Drinker.

Metal Cutting Session

"A Study of the Turning of Steel Employing a New Type 3-Component Dynamometer," by Prof. O. W. Boston and C. E. Kraus.

"Torque and Thrust of Small Drills Operating in Various Metals," by Prof. O. W. Boston and W. W. Gilbert.

Iron and Steel Session

"Bearing Investigation by the Varying

Wear Method," by J. R. Connelly and C. C. Hertel.
"Discussion of Pressure Indicating and Control Equipment for Rolling Mills," by F. F. Buckingham, O. S. Peters and S. B. Terry.
"Control of Bearing Pressures in Rolling Mills," by O. S. Peters and F. Buckingham.

AFTERNOON

Power Session

"Stresses in Three Dimensional Pipe Bends," by William Hovgaard.
"Creep Strength of Steels as Influenced by Microstructure," by L. L. Wyman.

Thursday, Dec. 5

MORNING

Applied Mechanics Session

"Fatigue of Cold Rolled Specimens," by O. J. Horger and J. L. Maulbetsch.
"Rate of Development of Fatigue Cracks in Steel," by A. F. deForest.
"Mechanical Properties of Bakelite and Its Behavior at Failure," by M. M. Frocht.
"Marblette as a New Photoelastic Material," by A. G. Solakian.

Radiant Heat Session

"Heat Transfer in Steel Reheating Furnaces," by J. E. Eberhardt and Prof. H. C. Hottel.
"Radiation from Nonluminous Flames," by Prof. H. C. Hottel and V. C. Smith.
"Tests of Radiation from Luminous Flames," by Prof. W. Trinks and J. D. Keller.

AFTERNOON

Applied Mechanics Session

"Analysis of Plate Examples by Difference Methods and the Superposition Principle," by Prof. D. L. Holl.
"Buckling and Ultimate Strength of Compresses Rectangular Plates," by Prof. S. Timoshenko.

Boiler Feed Water Session

"Effect of Solutions on Endurance of Low Carbon Steel Under Repeated Torsion at 482 Degrees Fahr.," by W. C. Schroeder and Everett P. Partridge.
"Embrittlement of Boiler Steel by Caustic Soda," by G. H. Wagner and J. R. Wall.
"Study of Effect of Concentrated Sodium Hydroxide on Boiler Steel Under Tension," by A. S. Perry.

Chicago Foundrymen Start Second Lecture Course

Chicago chapter of the American Foundrymen's association has begun its second annual lecture course covering materials used in the foundry. Tentative schedule of lectures: Oct. 14, Refractories in the Foundry, by John H. Owen, Harbison-Walker Refractories Co., Chicago; Oct. 28, Theoretical Aspects of Molding Sand, by Harry W. Dietert, H. W. Dietert Co. and American Radiator Co., Detroit; Nov. 4, Fuels Used in the Foundry, by M. F. Becker, Whiting Corp., Harvey, Ill.; Nov. 11, Sorting, Selection and Classification of Foundry Scrap, by Benjamin Schwartz, director-general, Institute of Scrap Iron and Steel Inc., New York; Nov. 25, Alloys Used in the Foundry, a series of short talks by prominent metallurgists; Dec. 2, Customer's Inspection of Foundry Products, by Roy Kinder, Miehle Printing Press & Mfg. Co., Chicago.

WELDING, et cetera . . .

BY ROBERT E. KINKEAD

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

What Is a Weld?

Recent announcement of a new English process which, it is claimed, will solve the problem of welding such metals as duralumin brings up the much discussed question of what is a weld. From the advance information, the English process is what we call soldering in this country. At any rate, it appears that the joint is made at a temperature too low to destroy the physical properties of the alloy derived from mechanical treatment. The plain fact is that the line of demarcation between soldering, brazing and welding is a very fuzzy one. The best illustration in American practice is the case of hydrogen copper brazing which is sponsored by the General Electric Co. We are of the opinion that this process fulfills the definition of a weld, if there is one, although the joint between two pieces of steel is made with copper. Almost any kind of a fused joint between pieces of metal may be called a weld. However, we have seen some welds that were put together so fast and came apart so easily that the only term we could think of was "zipper."

Under Load

Lap welds made by oxyacetylene or electric arc process are objectionable on account of their low resistance to repeated application of the load. Most of the data published on the strength of such welds were obtained by application of static loading. Of course, lap welds which are loaded parallel to the long dimension of the joint would not be subject to this objection, but there are few cases in which such loading is possible. The fact is frequently pointed out that riveted joints are loaded transverse to the long dimension of the seam as justification for the same practice in welding. But caulking opens up and rivets work loose under repeated loading transverse to the seam. A butt weld is easier to make than a lap weld in many cases, costs less, and will last longer.

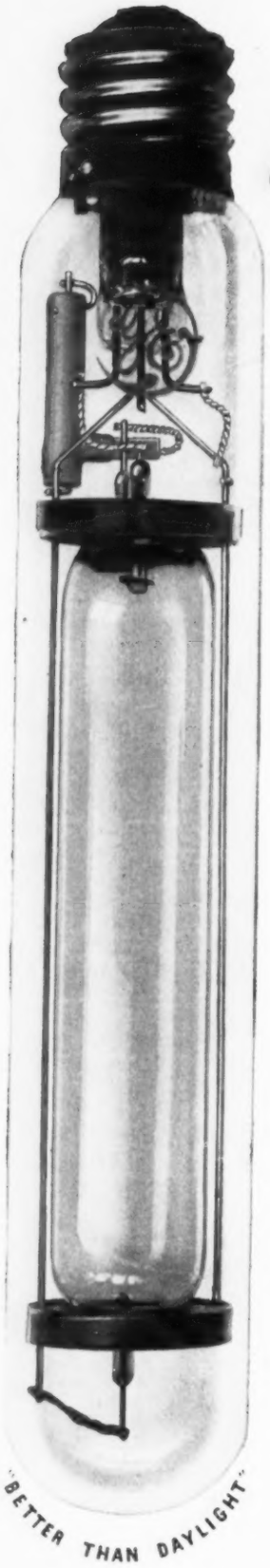
Alloy Welding Not New

Welding of the high alloys which is receiving so much attention at the present moment got away to a good start some eighteen years ago. Certainly welding 14 per cent manganese steel to manganesese steel frogs and crossings, a high alloy welding job that has to stand cold rolling, impact and abrasion was a far different kind of a job than the welding of low-carbon steel. And in the same class was the welding of air hardening steel to worn flanges on locomotive driving wheel tires to resist the torture of taking curves at a mile a minute. There is a vast amount of experience to prove that the alloy overlays can "take it." The present rapid progress is a continuation of welding technique, not a beginning.

Cars of Tomorrow

While steel car fabricators have been waiting for the railroads to order new steel cars, other manufacturers have developed the truck body business. A large Detroit trailer body manufacturer has a dozen arc welding units which are in use 24 hours a day making welded steel bodies for trucks which are one-half to three-fourths the size of a freight car.

High-tensile steel, aluminum, Dow metal and other high grade materials, together with welding, are used to get the most pay load per pound of body weight. Steel car fabricators possibly can see the rough outlines of the freight car of tomorrow by looking at the truck trailer body today.

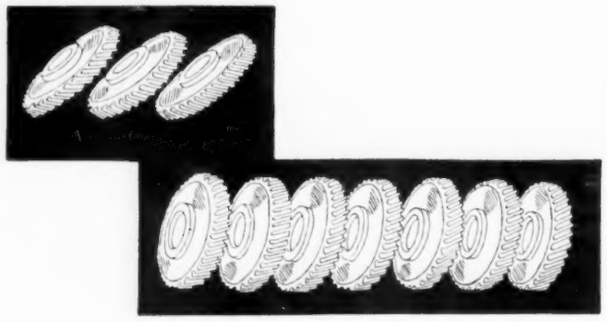


Order your auxiliary devices which were designed especially for this lamp from the General Electric Vapor Lamp Company.

Faster,

MORE ECONOMICAL PRODUCTION

with this detail-revealing light



Speed up production by improving your lighting. Make it easier for workmen to see scribe lines on dies, to read steel scales, to catch misfit mountings, poor soldering, and other sources of lost time and accuracy. The General Electric High Intensity Mercury Vapor Lamp provides the quality of light that penetrates into all corners, that makes shadows luminous, and removes harsh, irritating glare.

Details under this light stand out so boldly that they appear to be magnified. The slightest variation in color shading, too, is immediately apparent.

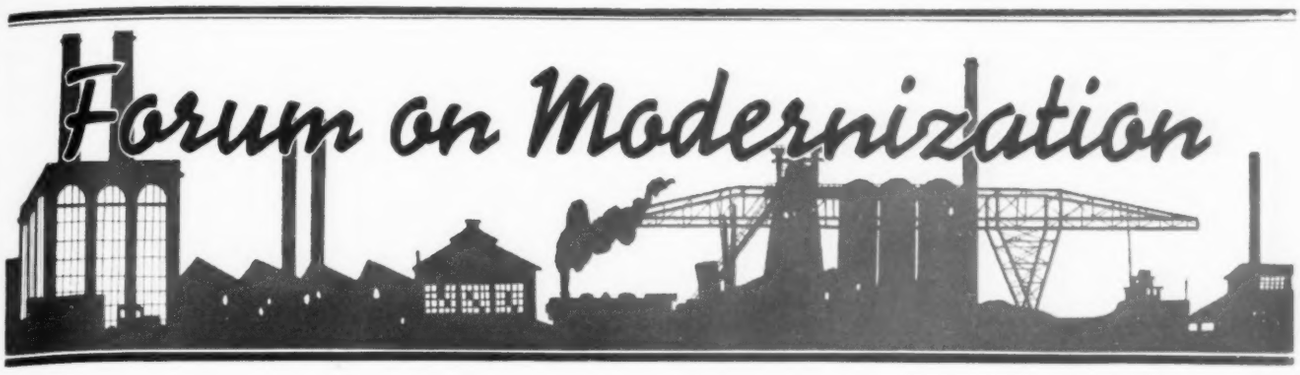
Workmen feel a minimum fatigue from eye-strain under the High Intensity Mercury Vapor Light. There is none of that costly end-of-shift let-down in efficiency due to eye-strain. This fact means more accurate work and fewer rejects . . . and decreased rejects mean money saved for the owner.

Write for the new booklet describing this light in detail. Address the General Electric Vapor Lamp Company, 883 Adams Street, Hoboken, New Jersey.

GENERAL ELECTRIC VAPOR LAMP COMPANY

659 Copr. 1934, General Electric Vapor Lamp Co.

HIGH INTENSITY *Mercury Vapor Lamp*



Quantity and Type of Work To Be Done Govern Value of Replacing Equipment

BY D. R. DAVIES
President, Acme Machinery Co., Cleveland

HOW much and what kind of work have you to do? This is the question which must be answered in determining whether modernization can be effected with profit. A new machine, no matter how efficient, represents a waste of money unless it be put to work.

Where the work is of a production character, that is, where duplicate parts are produced in large volume, the answer is indicated clearly. Equipment of latest design can effect production cost savings which pay for the new units in a reasonable length of time, in addition to producing a better product.

For example, this is true of cushioned drive upsetting and forging machines for volume production of large and small forgings. Recent developments have resulted in making obsolete any forging machine which is more than five years old. With the same amount of effort, heat, power, labor and other costs, the latest machines yield at least 20 per cent more production than their predecessors. Because of the improvements, the old machines in production lines are costing money which would soon pay for new machines.

Maintenance Costs Are Less

The new machines also are much less costly to maintain than the older ones. Parts are larger, the machines are more rigid, the wearing parts have ground surfaces and there is less friction. Alignment is maintained, with the result that the new machines increase the die life tremendously.

On the other hand, there are situations where the manufacturer of modern equipment cannot offer much argument. In one case a small company wants a large forging machine for doing a limited amount of work. New, the machine would cost around $20,000, whereas the company can get an old one at around $1200. This machine is not wanted for work on a production scale. The company takes the attitude that it is better to buy the used machine and later, if business improves and volume builds up, replace it with a new one. Situations of this sort are encountered frequently and no honest manufacturer is justified in endeavoring to sell an expensive new machine to a company which has insufficient work to enable the machine to pay its way.

Full Volume Not Necessary

But not in all cases is it necessary to have volume production work to justify the purchase of new equipment. We have an interesting case up at the present time in which an old customer has inquired for a repair part for a thread cutting machine made by our company 51 years ago. This machine had paid for itself many times over and yet the user, for sentimental reasons, is anxious to hang onto it. Although not used on production work it is kept busy on miscellaneous work and short runs. Study of this case indicates clearly that a new thread cutting machine of latest design would save this company money on every operation done on it and that it would pay for itself in a year.

There are a number of reasons why this machine shows great savings over the older models. It may be used on any kind of threading work, either on production schedules or on short runs. It has eight speeds, any one of which can be obtained instantaneously by the movement of a single lever. It has roller bearings and other construction features which enable us to put a 2-horsepower motor on it whereas the machine it supplants required a 5-horsepower motor. The new machine has a greater range of adjustment and produces better work. Although too new to enable us to compile complete data, we are conservative in stating that the new machine will produce at least 25 per cent more work than the older machine.

From 48 Minutes to 12 Minutes

In one case the new machine is being used in cutting lead screw threads on 1¼-inch diameter steel bars 36 inches long. The threads run two per inch, 86 degrees and are full depth Acme style. This job is performed in two operations in a total of 12 minutes. Previously the bars were cut on a lathe at the rate of five pieces in four hours. In this case the bars are handled on the new machine in short runs. Other miscellaneous thread cutting work is also handled on the machine, with gratifying cost savings. The new machine is paying for itself at a satisfactory rate.

These examples are cited for their suggestive value. Manufacturing problems vary so much in character that it is not safe to attempt to lay down any definite rule covering modernization. In general, when production work is involved, it is found that the machinery of latest design offers great savings as compared with the costs on old machines. Manufacturers whose operations are of a volume production character have been giving unmistakable evidence lately of an appreciation of the possibilities.

On work of a miscellaneous or short-run character the full extent of the profits and other advantages to be obtained by investing in modern equipment have not been so fully understood. In some of these installations it clearly would not pay to replace old units which now are

sufficing for the work. But there are many other cases where new machines, as in the case of the thread cutting operation cited above, would prove a fine investment.

In any event, all manufacturers will do well to investigate the possibilities of modern equipment, and to give full information about their operations to the equipment builders who always are glad to assist in solving manufacturing problems.

Profit Possibilities of New Machinery Should Be Studied by Heavy Industries

BY E. BLAKENEY GLEASON
Vice President, Gleason Works, Rochester, N. Y.

FOR the last several years we have heard a great deal about the imminent revival in the heavy capital goods industry. However, it is only within the last year that this revival has reached proportions sufficient so that they were visible to the general public.

Recent machines developed by our company have been identified particularly with the automotive industry, where the spiral bevel or hypoid drive for the rear axle has been accepted as standard practice for a great many years. This identification of the spiral bevel gear with the automotive field has been so marked that other uses of gears of this type have receivd comparatively little attention. Nevertheless, curved-tooth spiral bevel gears are being employed extensively in other installations. They have supplanted straight bevel gears in drives that run at high speeds and wherever quietness and smoothness are the deciding factors. The introduction of the hypoid gear in 1925 offered advantages of design and performance to the automotive field. Recently hypoids have found favor in other fields.

Applications Are Numerous

Application of spiral bevel and hypoid gears is found in grinders, polishers, molding machinery, paper-making machinery, dredges, oil well pumping and drilling equipment, printing presses, compressors, rolling mills, wire machinery, boring mills, locomotive drives, mixers, and reduction units, as well as in a large variety of other places. The advantages which have built up the use of these gears may be classified under the headings of greater wear capacity, greater strength, increased efficiency and greater smoothness and quietness.

Some of the ordinary reasons for replacement of old equipment are the desire for labor saving, for increased productivity, for increased accuracy of the product, as well as the requirement to replace equipment which is so worn that it is no longer usable. As was suggested in the beginning, the heavy industries have been rather slow in arriving at a point where they would go in for replacement of their equipment. This has been the result of economic conditions and not of any lack of initiative on the part of the companies concerned. At the same time, with the advent of better business and the improved machinery, which has been developed in the course of the last five years, these industries can no longer afford to overlook possibilities of gaining great financial advantage by the replacement of machinery which has been in operation for a period of years and which has been considerably obsoleted by new designs.

Increased Wear and Strength

Specifically what are the advantages obtained by the replacement of the straight bevel gear by the spiral bevel or hypoid gear? In the first place, there is an increase of fully 25 per cent in the wear load capacity over the corresponding straight bevel gears. This is because of the overlapping tooth contact. In the second place, there is an increased strength of fully 25 per cent, the resultant of the greater number of teeth in contact at all times. In the third place, from a cost standpoint, spiral bevel and hypoid gear drives cost little, if any, more than ordinary straight bevel gear drives for the same service. One factor in this conclusion is that straight bevels must be, at least, 25 per cent larger for the same load carrying capacity. This, together with the added cost of the larger housing, bearings, etc., as well as the extra weight, higher surface speeds, and lubrication problems, results in only slight difference in the cost of the complete drive. In the fourth place, the smaller spiral bevel or hypoid gear drives are by far the more satisfactory as to quietness and smoothness, and accordingly are less expensive in the final analysis.

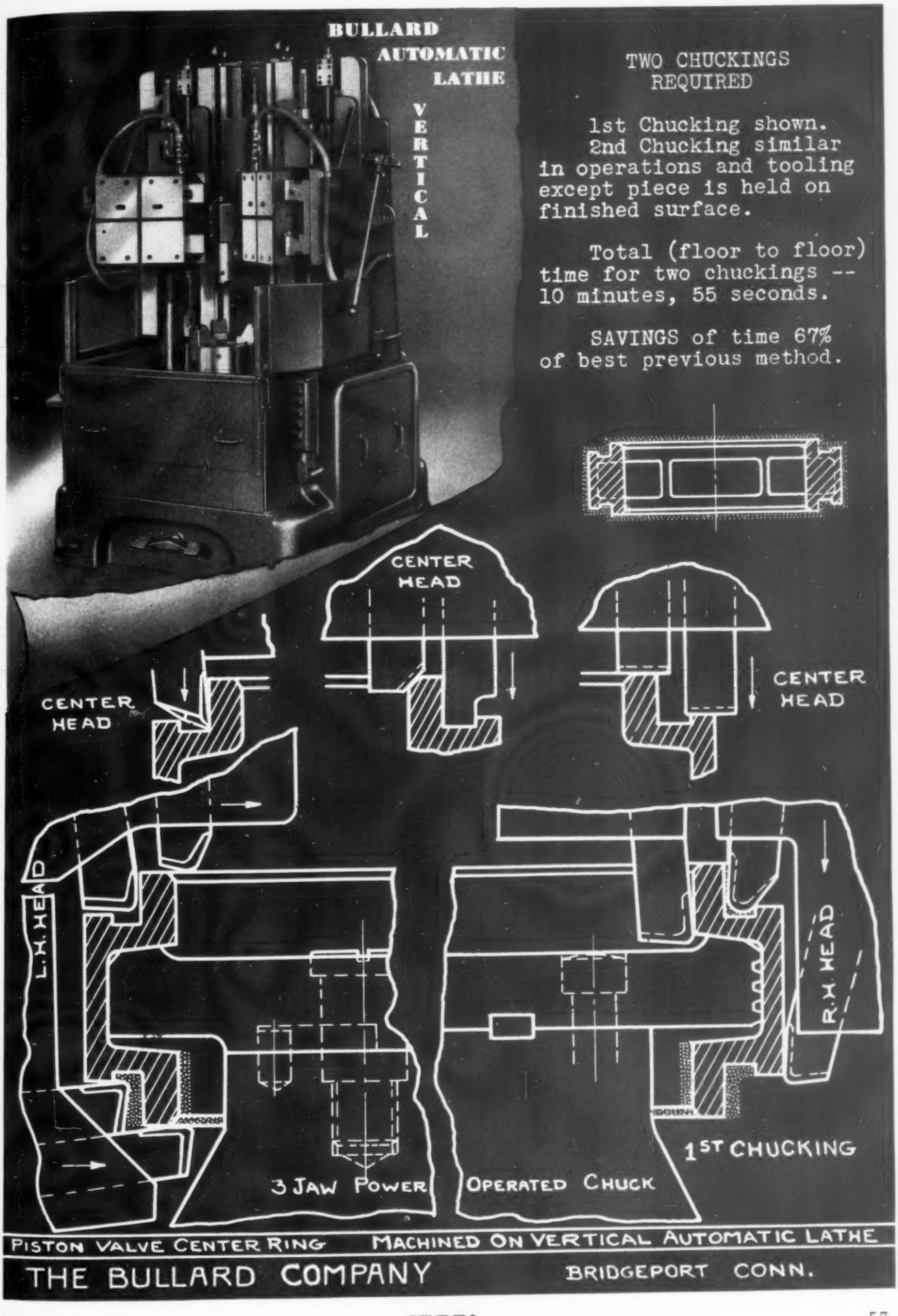
Along with the development of the large spiral bevel and hypoid gears for industrial uses, our company has developed a new method of surface hardening the teeth of the gears. The apparatus for accomplishing this result has the advantages of causing no measurable distortion of the teeth, of leaving the uniform bearing on all the teeth, and of automatic operation. Of course, the hardening of the teeth gives a much stronger and longer-lasting gear than is possible with the soft steel teeth which were used prior to the introduction of this method.

Taking the developments made by our company as an illustration, it is certainly to the advantage of the heavy industries to reconsider seriously many present methods of operation and of the construction of machinery. In the purchase of machinery for our own plant, we are repeatedly surprised by the radical advances which the machine tool industry has made. For the last several years we have been carrying on a program of replacement of the machinery in our own plant. When a machine gets to be ten years old it is open to serious investigation, because it is seldom that sufficient advances in construction and design have not been made in such an interval to pay considerable dividends on replacement.

Tells Why Alloy Steels Show Better Performance

The application and handling of nickel and other alloy steels in four important fields were outlined by H. J. French, International Nickel Co. Inc., Bayonne, N. J., in addressing the Schenectady, N. Y., chapter of the American Society for Metals, Oct. 15.

Speaking in technical terms, Mr. French explained how and why the use of alloys in steel helps to increase resistance to fatigue in forgings used in heavy machinery and told how alloys can improve performance and produce better qualities in castings. Turning to the use of nickel steels in welding, Mr. French pointed out that these alloys retain their toughness at low temperatures and hence have been found valuable in the construction of welded pressure vessels employed in certain low temperature processes for the refining of oils.


BULLARD
AUTOMATIC
LATHE
VERTICAL
TWO CHUCKINGS
REQUIRED
1st Chucking shown.
2nd Chucking similar in operations and tooling except piece is held on finished surface.
Total (floor to floor) time for two chuckings -- 10 minutes, 55 seconds.
SAVINGS of time 67% of best previous method.
CENTER HEAD
CENTER HEAD
CENTER HEAD
L.H. HEAD
R.H. HEAD
3 JAW POWER OPERATED CHUCK
1ST CHUCKING
PISTON VALVE CENTER RING MACHINED ON VERTICAL AUTOMATIC LATHE
THE BULLARD COMPANY BRIDGEPORT CONN.

IMPROVING OPEN-HEARTH FURNACE DESIGN

by William C. Buell Jr.

Chapter XI — Part I

Flues

FLUES are the ducts through which the combustion air or gaseous fuels flow to the regenerators; they enter at areas A_{12}. The regenerators periodically and alternately receive the effluent furnace gases at the same areas and direct them to the waste heat boiler if included and operating, or to the stack which is but a vertical continuation or termination of the flue system.

Owing to the requirement for the reversal of a furnace its flues are appropriately interconnected to accomplish the change of flow direction through the action of suitably installed and operated valves.

As a matter of general convenience, but specifically to conserve floor space, retain heat and assure the minimum of leakage to or from the atmosphere, the flues are placed below ground level and earth covered.

If the furnace is operated with forced and/or induced draft the stack or chimney is necessary only as the vehicle by which the fumes and waste heat of the process are dissipated at a sufficient elevation above ground to prevent obnoxious effects to man or property. If a furnace is designed to operate without induced draft then the stack becomes the generator of the draft of the effluent side and is indispensable to operation.

Requires Ample Areas

Good layout calls for a symmetrical flue design with the necessary turns or bends eased to the greatest possible degrees in order to minimize friction or turbulence and thus conserve draft. The detailed design requires the development of ample areas in order to permit the maximum flow of the fluids at such low velocities as will not dissipate the available draft in friction losses. Footings for charging floor, crane, or building columns must be located so as to afford the least possible interference with the desirable features of flue layout.

Immediately following the invention of the open-hearth process and the construction of the first furnace by Siemens and the Martin brothers, the necessity arose for valves suitable for reversing the furnace. Siemens after several trials and experiments invented the butterfly valve that bears his name. The installation of these valves required that the flues, which alternately were to be open to the atmosphere or circuited to the gas producers and connected with the stack flue, should be brought to ground level. The valves, which were set at that elevation, extended somewhat above it in order that the frequent repairs or replacements could be made quickly and conveniently. All of this resulted in a generally accepted flue layout type, such as illustrated in Fig. 179.

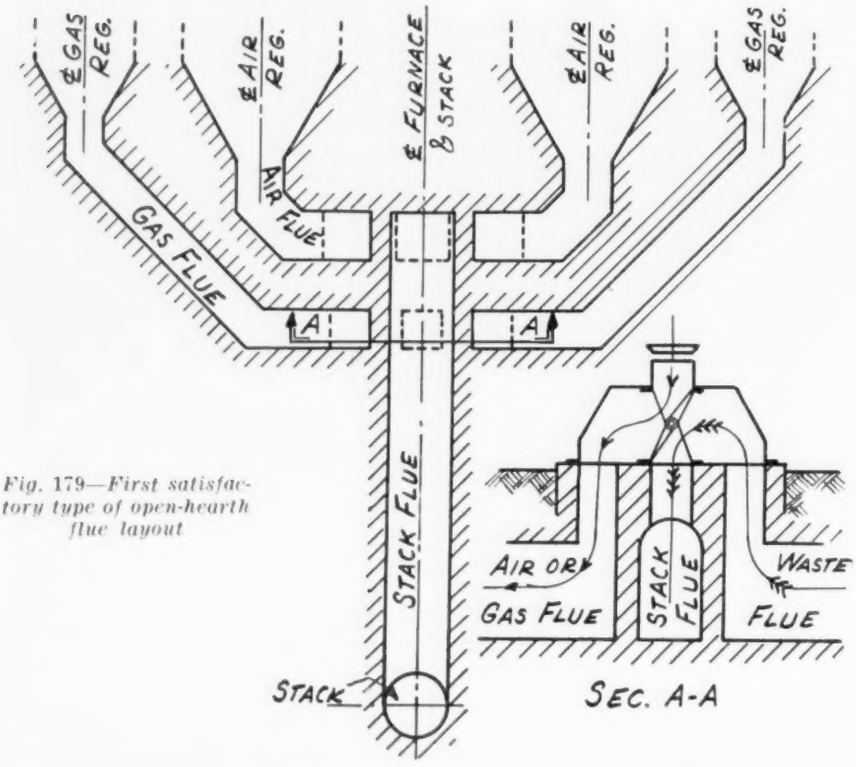


Fig. 179—First satisfactory type of open-hearth flue layout

Influenced American Design

This flue arrangement was included in the first successful open-hearth furnace operated in the United States—that of the Bay State Iron Works. The influence of this installation has dominated in American open-hearth design until comparatively late years. The great weakness of the type, omitting reference to the valve arrangements which are discussed in the subsequent chapter, is that the turning of the fluids from a subgrade horizontal flue, upward to the valve at grade, thence at right angles through the valve and again at right angles downward to the stack flue interposes not less than 360 degrees of added angularity of fluid flow. This will cause a loss of at least 1 inch of water pressure of the available draft and seriously may impair operating rates with natural draft operation, or will require an unnecessary consumption of electric current if mechanical draft is installed, through the requirement of

STAMPING PROGRESS

With this press, 400 tons of smooth power are released on your stampings with such precision and steadiness that the metal is not forced, but flows into the die, eliminating tears and reducing strains and wrinkles—assuring stampings of greater uniformity and higher quality. Let us put this powerful press to work on your next stamping order.

You are looking at the only press of its kind in the Stamping Industry . . the new 400-ton HPM Hydro-Power Triple Action Deep Drawing Press, specially designed for Transue's Stamping Plant. . . This press was exhibited at the Machine Tool Show in Cleveland where it was conceded . . . "the most advanced step in the industry."

TRANSUE & WILLIAMS

ALLIANCE, OHIO

DESIGNERS AND MAKERS OF DEEP DRAWN STAMPINGS

that much higher fluid pressure.

It appears that in the early days of the art the weaknesses of the Seimens reversing method and the desirability of improvement were recognized, for in 1886 U. S. Patent No. 335,200 was issued to Charles M. Schwab, and an associate, Thomas James, on a "valveless" regenerative and reversing furnace. The furnace specifically described in the patent specification is a melting furnace with air regenerators only. Each regenerator has a separate stack equipped with a mushroom valve or flap damper at the top. The only other valves in the system are air inlet valves of the slide type, which are interconnected with the stack

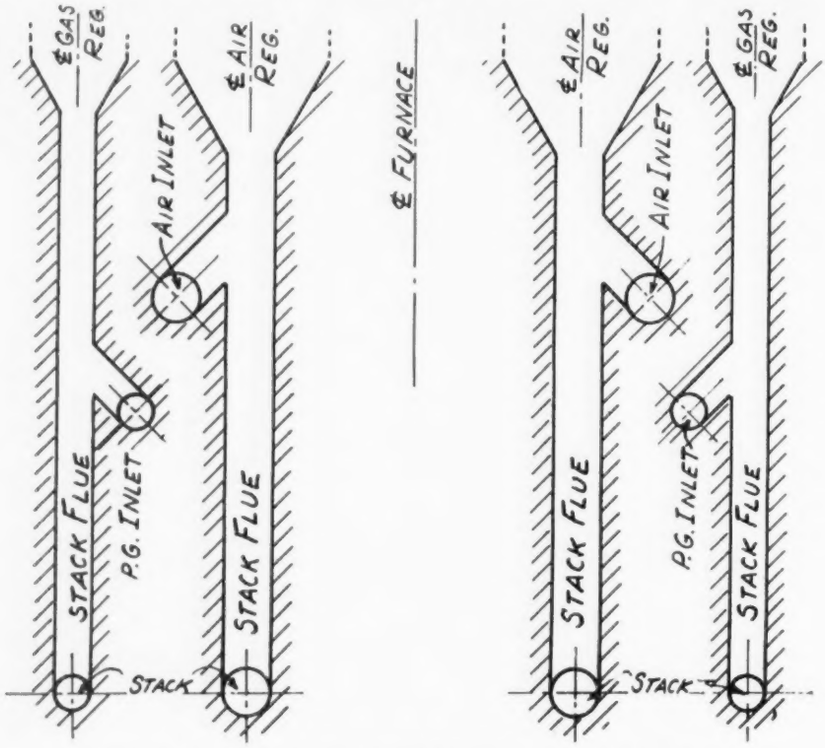


Fig. 180—Valveless flue arrangement patented by Schwab

valves. Thus by suitable manipulation of the dampers at the top of the stack, and the synchronized air valves, the furnace is reversed and the fluid volumes regulated. The flue system accordingly contained but single right angle turns at the base of the stacks. With producer gas operation four stacks would be necessary and the layout would be similar to the diagram presented in Fig. 180, if horizontal regenerators were included rather than the vertical regenerators as disclosed in the patent specification.

Minimizes the Angularity

Although seldom so acknowledged the idea as patented by Schwab and James is the foundation of the modern flue system, which supplemented by the later invention by Luther L. Knox of a practical inclined slide valve allows the design of the present simple flue system with the minimum of summated angularity.

Slide Valves Are Favored

Today the flue system with inclined slide valves is recognized as by far the most advanced type for operation with any kind of fuel with one exception of limited application. The single exception, which requires the use of a positively sealed valve necessitating an above-ground design, is the Bansen system of blast furnace-coke oven gas firing, in which the mixed fuel is introduced into the gas flue before the gas regenerator, and seepage of this fuel to other parts of the system might be disastrous.

Although subject to considerable modification of detailed design modern flue systems are of but two fundamental types, with a third type of special layout. The two principal types of layout are illustrated, Figs. 181-A and 181-B.

The summated angularity, the only rational basis for a comparison of the effectiveness of flue layout is less in the arrangement B than in A. This fact would indicate B to be superior to A, were it not that the economic data of Table CXVI has proved definitely the double regenerator chamber with its center wall to be less costly to operate than the arrangement with two entirely separate regenerator chambers. If the more economical center wall regenerator is to be used then the type A layout is best, but if the separate chamber arrangement is included then the type B layout should be incorporated.

The several diagrammatic layouts of the flues show the air inlet, A_{in}, at the side of the appropriate flue. This serves for typical presentation; the design often is found in service. However, a better arrangement is to place the air inlet directly atop the waste flue (air). Not only does this economize on brickwork, but will save 45 degrees of angularity.

The design of the connection of the gas flue and the waste flue (gas) into the gas connecting flue shown in Fig. 181-B probably is superior to that shown for A, as likely developing better distribution of the fluids through the rider system and under the checkers. Obviously the arrangement of the stack and stack flue, Fig. 181-A, will be interchangeable with that shown in connection with the waste heat boiler flue, Fig. 181-B. The depth of the space necessary for the inclusion of the two flue types under discussion in unabridged form is considerable. The design of Fig. 181-A is capable of considerable abridgement in depth without undue increase in angularity, and that of Fig. 181-B but little. Unabridged flues of the A type are found only in connection with furnace L and of the B type with furnace K.

Flue Built at Right Angles

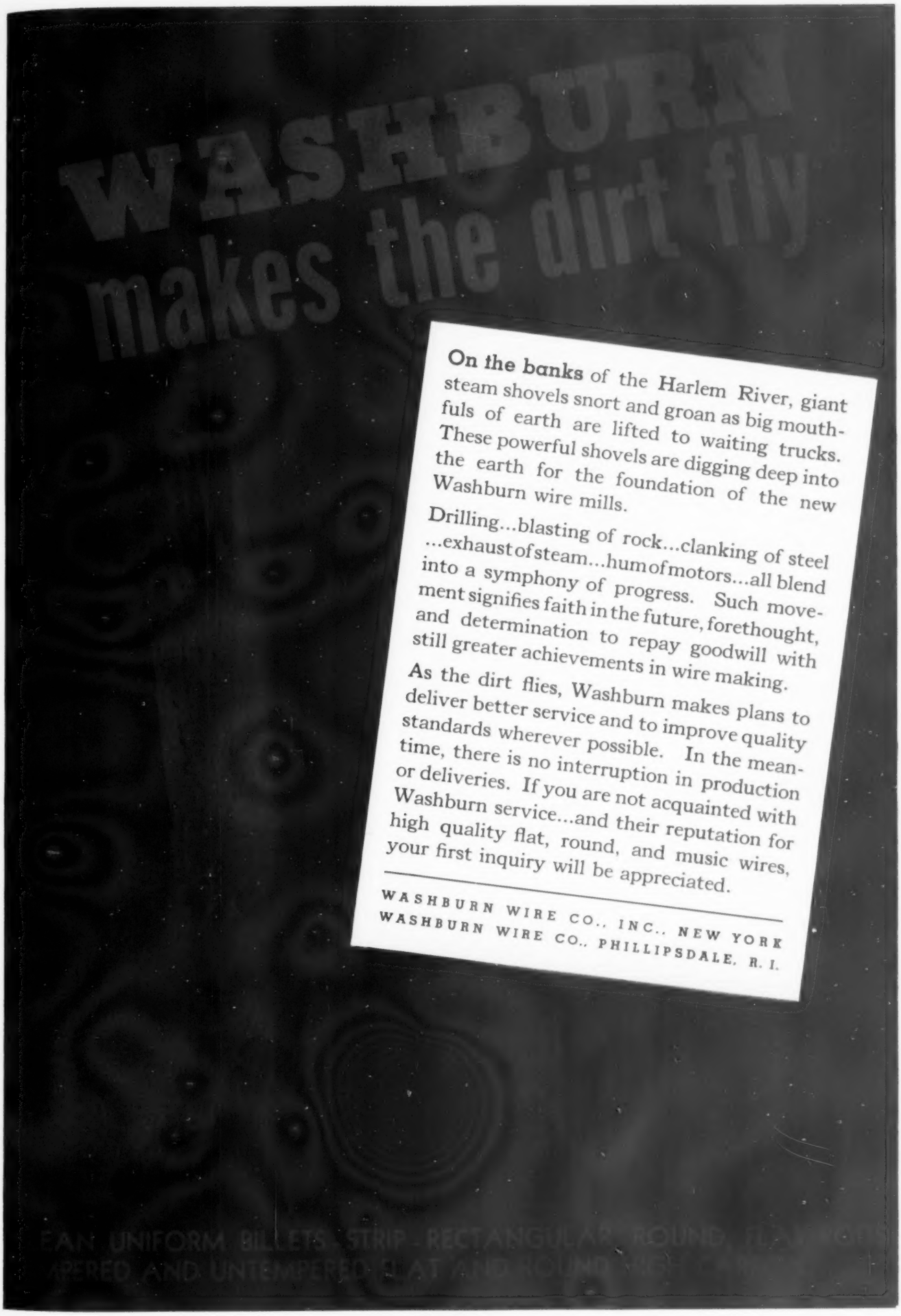
A common abridgment of the A type is seen in Fig. 181-C. This is accomplished by adding the collecting flue at right angles to the stack flue. This alteration increases the angularity of fluid flow by 90 degrees. Flues shown in connection with furnaces A, J, N, O, I, D and E are of the C type.

When a leanto is omitted in the building design or where included but having a nominal width (see Table LXXXIX, column i) it may be expected that the depth available for the installation of the flues will be circumscribed severely. When this condition occurs the layout of the flues will be much abridged and a design similar to that shown in Fig. 181-D likely will be disclosed. Such an arrangement is a decided handicap to good operation. As illustrated, the design is included with furnaces H* and F.

While the angular severity of the lines of fluid flow, preventing good distribution, is the fundamental fault of the design, the absence of valves for the outer or gas regenerators, by means of which volume of flow to the different chambers might be regulated, likely causes an unbalanced regenerator condition.

The flues of furnace M are similar

*The width of the leanto, furnace H, is shown erroneously in Table LXXXIX, column l, as 41½ feet. The correct figure is 12 feet.


WASHBURN
makes the dirt fly
On the banks of the Harlem River, giant steam shovels snort and groan as big mouthfuls of earth are lifted to waiting trucks. These powerful shovels are digging deep into the earth for the foundation of the new Washburn wire mills.
Drilling...blasting of rock...clanking of steel ...exhaust of steam...hum of motors...all blend into a symphony of progress. Such movement signifies faith in the future, forethought, and determination to repay goodwill with still greater achievements in wire making.
As the dirt flies, Washburn makes plans to deliver better service and to improve quality standards wherever possible. In the meantime, there is no interruption in production or deliveries. If you are not acquainted with Washburn service...and their reputation for high quality flat, round, and music wires, your first inquiry will be appreciated.
WASHBURN WIRE CO., INC., NEW YORK
WASHBURN WIRE CO., PHILLIPSDALE, R. I.

to this design but not so closely coupled, while those of furnace P and G while as closely coupled as in the illustration have the necessary valves to control the fluid flow to the gas regenerators. Abridgment of flue design to the degree indicated in Fig. 181-D should be avoided if efficient operation is desired.

Improves Furnace Practice

The flue layout as recommended by the vendors of the Isley system is illustrated in Fig. 182. While the principal advantages said to accrue from the inclusion of this system are relative to combustion conditions, the auxiliary checkers placed in enlarged flues and the increased and positive draft may be expected to improve furnaces with regenerators which are too small, or in which draft has been unsatisfactory. It is thought that the maximum of below-floor operation would be secured only after a regulating damper has been placed before the air regenerator. The Isley type of installation is included with furnace B.

(To be continued)

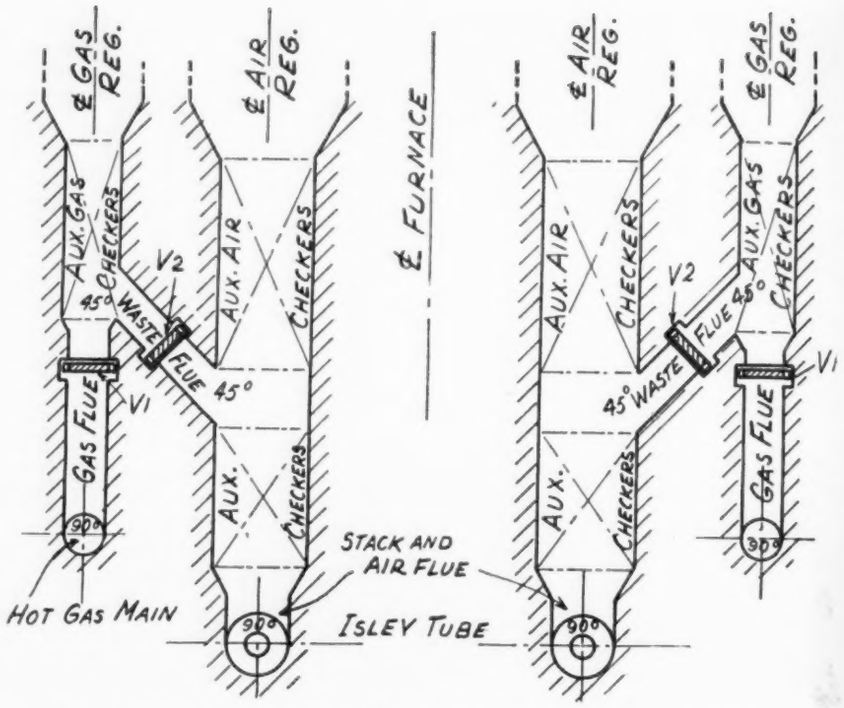


Fig. 182—Auxiliary checker and flue layout for application of Isley system

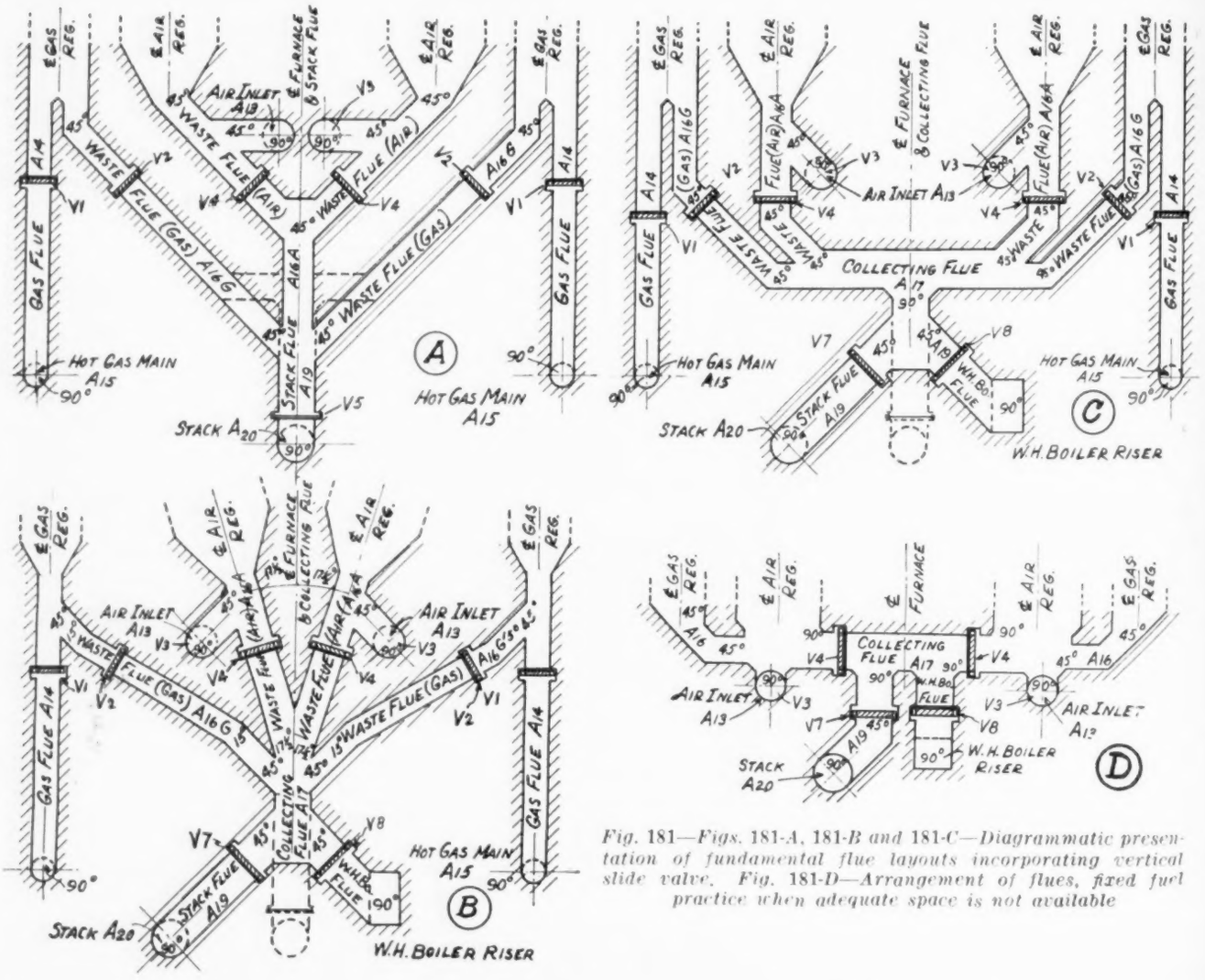
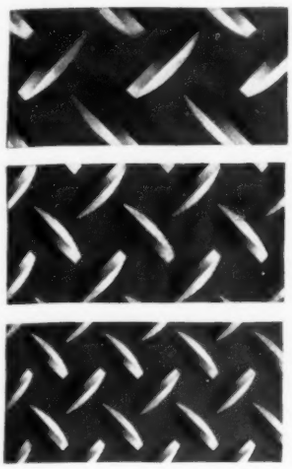


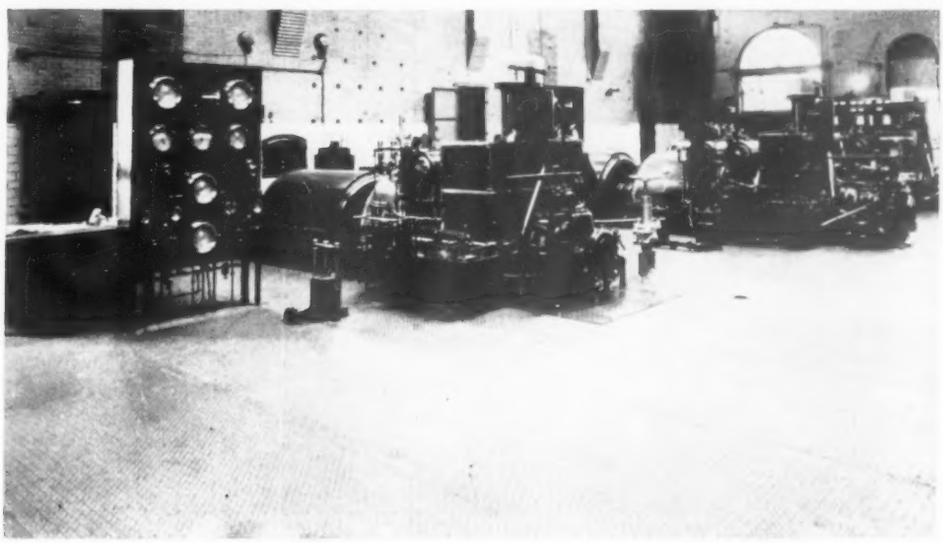
Fig. 181—Figs. 181-A, 181-B and 181-C—Diagrammatic presentation of fundamental flue layouts incorporating vertical slide valve. Fig. 181-D—Arrangement of flues, fixed fuel practice when adequate space is not available

Since 1931··Inland 4-WAY Floor Plate

Stands Guard Over Thousands of Danger Spots



Relative size of projections on Large, Small and Light Patterns of Inland 4-Way Floor Plate.



Above: Inland 4-Way Floor Plate around power-house equipment—Wilson & Co., packers, Chicago. Below: Lift truck by Mercury Mfg. Co., Chicago. Operator's platform of Inland 4-Way Floor Plate.

● Inland 4-Way Floor Plate is already an old product, measured by its tremendously varied and widespread application. Introduced in 1931, it was accepted as the answer to the problems of making danger spots safe for foot or wheel.

It was far in advance of any steel floor plate. Its new 4-Way pattern (patented) combined 4 advantages which could not be secured elsewhere: 4-Way Safety (equal resistance to slippage 4-Ways instead of two), 4-Way Matching, 4-Way Drainage, and Extra Stiffness (projections overlap, reinforce one another lengthwise as well as crosswise of plate).

Made in 3 patterns, differing only in size of projections, and in thickness from 16 gage to ¾ inch to meet all requirements exactly. Write for new descriptive folder. INLAND STEEL COMPANY, 38 South Dearborn Street, Chicago, Illinois.

4-Way Safety

Extra Stiffness

4-Way Matching

4-Way Drainage

INLAND STEEL

Sheets Strip Tin Plate
Plates Structurals Piling

Rails Track Accessories
Bars Rivets Billets

Controlled Cooling of Rails Improves Structure, Prevents Shatter Cracks

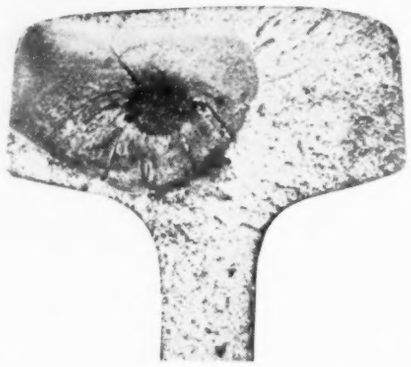
STEEL rails reflect, as do other steel products, the efforts of manufacturers in bringing about improvements to meet present-day demands. As a consistent contributor to the railway industry in general, Bethlehem Steel Co., Bethlehem, Pa., has carried on an investigation to effect an improvement in the structure by controlling the rate of cooling the rail after manufacture (see STEEL, Oct. 21, p. 32), in a manner somewhat similar to that employed for certain other steel products.

The cooling of any steel product after manufacture is accomplished by radiation of heat from the exterior surfaces which thereby lose temperature, causing a temperature differential between the interior and the surface of the mass. This differential, under normal cooling, continues until the entire mass has cooled to the temperature of its surroundings. Cooling produces shrinkage, and differential shrinkage produces stresses. While the steel is plastic from heat, these stresses are absorbed in the distortion, but as rigidity occurs, resistance to distortion increases and unrelieved stresses are produced. Soft steels retain sufficient plasticity at atmospheric temperatures to keep dangerous cooling stresses from building up or cooling cracks from forming, but hard steels require much more careful cooling to prevent damage.

Rail Steels Harder

In the early years of this century rail steels were much lower in hardening elements than they are today. The plasticity of the steel was much greater and rail failures were comparatively rare, but as wheel loads, speeds, and tonnage increased railroads demanded harder, and longer-wearing rails until today standard rail steel contains manganese up to 1 per cent and carbon up to the eutectoid point (0.87 per cent).

Twenty-five years ago the transverse fissure failure was not known, but since the wrecking of a train at Manchester, N. Y., on Oct. 25, 1911, the internal transverse fissured type of rail failure has been growing in prominence to the railroads, until today it is recognized as of such importance that the Association of American Railroads and the rail manufacturers are sponsoring at the University of Illinois a quarter-million dollar investigation. This and other independent investigations have indicated that this type of failure is sometimes brought about by internal cooling stresses in the rails, which occasionally result in actual fissures known as shatter cracks.



Typical example of transverse fissure failure in rail head

These shatter cracks occur mostly in the interior of the rail (generally in the head) and are detected in unused rails only by deep etching of the interior. Etching tests on small specimens has been the usual method of testing, but these are not dependable because the defect often occurs only locally. The only safeguard is prevention by controlling the rate of cooling of all the rails while passing through the sensitive zones.

It has been determined that the maximum rigidity and minimum ductility of rail steel occurs at certain temperatures below the transformation range (A_1-A_3). Extensive experiments have shown that a control of the cooling, which would minimize heat differentials in the rail for a range extending from 950 degrees Fahr. to below the blue-heat zone, prevents the formation of interior shatter cracks.

Tests made on many rails subjected to this type of control as compared with those conducted on rails made from the same heats of steel, but cooled in the ordinary way, corroborate the theories enunciated. Further corroboration has been brought about by the results so far obtained from limited-time service tests.

Tata Mill Nears Record Output

FOLLOWING the completion of a 3-high automatic roughing mill built by the Mackintosh-Hemphill Co. at its Salem, O., shops, the complete unit was assembled and demonstrated Nov. 19, 1934, to about 150 sheet mill executives before shipment to the Tata Iron & Steel Co., Jamshedpur, India. A complete description of the mill was presented in the Dec. 17, 1934, issue of STEEL, p. 24.

This rougher in connection with the 2-high finishing mill, continuous furnaces, mechanical doubler, conveyors, etc. was installed as unit No. 2 of the Tata company's sheet mill extension and placed in operation May, 1935.

The extreme hot weather in India during the past summer (the hottest since 1921) and the initial troubles of starting a new unit, held back production materially on unit No. 2 during the early months of operation. According to the consulting engineers, however, the mill now is approaching the rate of production expected of the unit as a whole. The best performance to date for a week has been an average of 47.96 gross tons of sheared sheets per shift over 16 shifts.

Whereas the previous maximum 8-hour shift record on unit No. 1 (mechanized finisher but with hand roughing) had been 62.45 gross tons of sheared sheets, a new record was made recently of 66.0 gross tons.

On Oct. 17, unit No. 2 on two consecutive shifts made 66.5 and 64.3 gross tons of sheared sheets per shift, or an average of 65.4 tons.

Miss World Record

On the night of Oct. 18-19, in five consecutive hours out of the 8-hour shift, i.e. from 10 p.m. until 3 a.m. the mill made 51.9 gross tons of sheared sheets which was at the rate of 83.04 gross tons per 8 hours. The opportunity to make an all-time world's record for an 8-hour shift was spoiled by the burning out of a conveyor motor. The sheared size was $34\frac{3}{4}$ x 120 inches, 24 gage.

During the five consecutive hours while the foregoing tonnage was being produced, 36.31 per cent of the roll surface of the finishing mill was in contact with metal. The covering of this high percentage of roll surface with hot metal necessitates the use of large capacity and powerful blowers to keep the temperature of the rolls under control.

Bars were heated once, roughed in five passes in the 3-high mill; packs of three were heated in one chamber of the pack furnace and given one pass; the doubled sixes were heated in the other chamber of the pack furnace and finished in three passes, a total of four passes per pack on the finishing mill. The average time per pack was 25.13 seconds, and the average time per pair on the roughing mill was 16.75 seconds.

The particular rate of rolling, namely 83.04 gross tons of sheared sheets, is the limit of the heating capacity, the ability of the automatic tables to handle the packs, and the human endurance of the operators throughout.

THE YEARBOOK ISSUE *Jan. 6, 1936*

THE 1936 Yearbook issue of **STEEL**, dated January 6, 1936, will picture, to a greater extent than recent annual issues, the parade of progress in the iron, steel and metalworking industries. Instead of placing emphasis upon the problem of government—industry relations, as was the case in the issues of 1933, 1934 and 1935, the 1936 Yearbook will be devoted principally to the timely and appropriate service of interpreting for **STEEL**'s readers the great significance of the improvements in materials, methods and equipment recorded during the past year.

Many thousand executives—presidents, proprietors, vice presidents, secretaries, treasurers, works and general managers, purchasing agents, engineers and foremen know, read and preserve the Yearbook for the completeness of its information and its continuous reference value.

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

CLEVELAND

NEW YORK · PITTSBURGH · CHICAGO · WASHINGTON · LONDON

Advertising space reservations to date ahead of any year since 1930.

Advertising details on request.

GET MAD

if you must

PREMIER
TESTED
Welding Wires

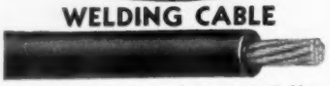
But

DON'T BLAME THE WELDER

unless you give him the right wire

WHEN a job goes wrong—when profits are lost in spoilt work and wasted time—look well to the wire he's using before you blame the welder. Pause a moment—then remember—even a skilled craftsman can't make the wrong wire do a perfect job. You can easily assure against such aggravating incidents by standardizing on Premier Tested Welding Wires. They're bound to be right—because the grade is plainly stamped on every wire and rod. Right, for quality too, because they are free flowing, deeply penetrating, constantly uniform—and have the proved ability to impart greater strength to the finished weld. Write us for interesting facts—and for a copy of the Welder's Handbook.

AMERCLAD ALL-RUBBER
WELDING CABLE



Extremely flexible, safe, non-kinking and tough. Manufactured in strict accordance with latest I.P.C.E.A. specifications for Arc Welding Cable

Size AWG	Min No. 34 Wires	Min Diameter Inches	Carrying Capacity Amps.	Voltage Drop 100' 60° C. Copper Temp.	Weight Lbs. Per 1,000 Ft. On Reels
8	416	0.390	50	3.71	180
6	661	0.400	75	3.58	220
4	1052	0.496	100	3.18	300
3	1326	0.560	150	3.70	350
2	1672	0.560	200	3.92	390
1	2109	0.625	250	3.88	500
1-0	2658	0.675	300	6.72	550
2-0	3353	0.750	375	3.68	720
3-0	4227	0.815	450	3.51	930
4-0	5330	0.900	550	3.41	1100
250,000 cm	6297	0.960	600	3.12	1250
300,000 cm	7557	1.030	650	2.80	1425

AMERICAN STEEL & WIRE COMPANY

208 S. LA SALLE STREET, CHICAGO · · EMPIRE STATE BUILDING, NEW YORK

Offices in All Principal Cities

Pacific Coast Distributors: Columbia Steel Company, Russ Building, San Francisco

Export Distributors: United States Steel Products Company, New York

United States Steel Corporation Subsidiary

ACETYLENE—

indispensable ally and trusted servant of industry—will be the theme of the program of the forthcoming thirty-sixth annual meeting of the International Acetylene Association in Cleveland, November 12th to 15th.

Recognizing the importance of the oxyacetylene process to the metalworking industries, **STEEL** takes pleasure in presenting complete details of the convention program, with appropriate supplementary information pertaining to the activities of the Association and to recent progress in oxyacetylene welding, cutting and allied operations.

36TH ANNUAL CONVENTION

Shop scene from "Profits of Progress"

Make Your Reservations Now
"PROFITS of PROGRESS"
An industrial drama featuring the 1936 profit opportunities of the oxy-acetylene process will be presented at the
I. A. A. 36th ANNUAL CONVENTION
CLEVELAND, NOVEMBER 12-13-14-15

IF YOU have never attended an I.A.A. Convention, come to Cleveland this year and see what you have been missing. If you attended the record-breaking Convention in Pittsburgh last year, we know that you and your friends will be with us in Cleveland this year. The Cleveland Convention promises to be bigger and better than ever. For the first time in its history, the International Acetylene Association, which is one of the oldest technical societies in the country, will meet in this great industrial center.

Profits of Progress

Did you ever promise to do something that nobody else believed you could do? Suppose you were president of an Engine Works and were threatened with the loss of your best and largest account and that in desperation you promised them to design and manufacture a new and unknown type of engine on short notice. How would you design the engine for speedy and satisfactory assembly? Without enormous capital expenditure, what could you do to your plant and its machinery to convert it to this new production program?

Come to "Profits of Progress" Tuesday evening, November 12, at 8:15 at the Music Hall of the Civic Auditorium and see what J. Malcolm Robinson, President of Robinson Engine Works, did under such circumstances and see how he did it. This four-act drama is an inter-

esting and exciting enactment of a problem involving many industrial executives and workers today.

Welding and Cutting Forum

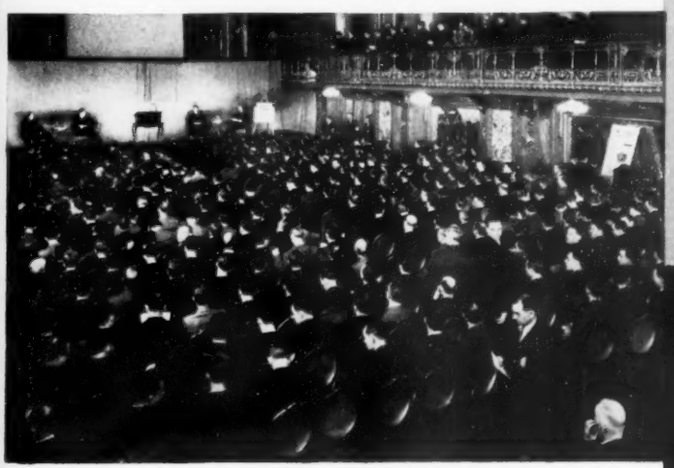
This year the I.A.A. Convention is instituting an entirely new feature. There will be a *Forum* on Wednesday evening, November 13, at 8:15 at the auditorium of the Brotherhood of Locomotive Engineers. Live demonstrations of more recent welding techniques will be shown. Also at the Forum you will have the opportunity of hearing welding and cutting problems discussed by practical operators as well as by engineers and technicians of national prominence. You will carry away with you information that will be permanently profitable.

Attend All Sessions

Look at the preliminary program of important subjects outlined at the right. These and many other topics will be covered by nationally-known authorities on their subjects. Plan now to attend all of these sessions. If you cannot be present at all of the sessions, be sure to get to those which involve your particular field. All Technical Sessions will be held in the Grand Ball Room, Mezzanine Floor, Hotel Cleveland. There is no registration fee.

Write for Complete Program

Write today to the Secretary, International Acetylene Association, 30 East 42nd Street, New York, for a copy of the Complete Program and tickets for the industrial drama, "Profits of Progress" and the Welding and Cutting Forum.



An interested audience attends an I.A.A. technical meeting

PROGRAM

Tuesday, November 12, 1935
Grand Ball Room—Hotel Cleveland

9 A.M.—*Registration*

10 A.M.—*Opening Session*

Keynote Address • Twelfth International Acetylene Congress, London, 1936 • Acetylene in the Chemical Industry • Presentation of Morehead Medal

2 P.M.—*Safety Session*

Studies in Industrial Health of Interest to the Oxy-Acetylene Industry • Prevention of Welding and Cutting Fires • Safe Handling, Storage and Return of Compressed Gas Containers

8:15 P.M.—"Profits of Progress"—*Music Hall, Civic Auditorium*

Wednesday, November 13, 1935
Grand Ball Room—Hotel Cleveland

2 P.M.—*Metallurgy of Welding and Cutting*

Welding and Cutting of High Chromium Steels Studies of Oxy-Acetylene Cut Steel Plate Hydrocarbon Fuel Gases for Cutting • Gas Welding Aluminum and Its Alloys

8:15 P.M.—Forum on Welding and Cutting—*Auditorium of the Brotherhood of Locomotive Engineers*

Thursday, November 14, 1935
Grand Ball Room—Hotel Cleveland

2 P.M.—*Piping and Pressure Vessels*

High Pressure Piping • Welding Class I Pressure Vessels • Welding of Piping and Pressure Vessels in the Marine Field • Permanency of Oxy-Acetylene Welding

Friday, November 15, 1935
Grand Ball Room—Hotel Cleveland

2 P.M.—*Transportation*

Maintenance-of-Way Problems in High Speed Transportation • Oxy-Acetylene Process in Maintenance-of-Way Work • Shape Cutting of Locomotive and Car Parts • Economic Advantages of the Oxy-Acetylene Process to Railroads

36th

Annual Convention

•

Hotel Cleveland

Cleveland, Ohio

•

November 12, 13, 14 and 15, 1935

INTERNATIONAL
Acetylene Association

ESTABLISHED 1898 • 30 EAST 42nd St., NEW YORK

ALL CLEVELAND RADIATES FROM THIS HOTEL

★ From Hotel Cleveland the entire city opens before you like a fan. Under the same roof with you are the five fine buildings of the Terminal development, and the Union Terminal itself. A step to the north are the government buildings. Just to the west are the great wholesale houses for which the city is famous. To the south are the industrial plants which buy and sell all over the world. To the east are shops and theatres.

Whether you come to Cleveland for business or pleasure, Hotel Cleveland will be nearer the places you want to visit than would any other hotel.

Convenience is only one of the many advantages Hotel Cleveland offers. Rooms are luxuriantly comfortable. Meals are famous. Everyone from bellboy to manager tries to *prove* we're glad to have you with us. And the people you see around you are the interesting sort that you'd expect to be attracted to a distinctive hotel like this one.

HOTEL CLEVELAND Cleveland

• *Rooms from $2.50 for one, $4 for two*

Industry Adopts Many New Uses for Oxyacetylene

BY E. V. DAVID,
General Chairman, Oxyacetylene Committee for 1935

FIFTEEN years ago the oxyacetylene torch still was considered by many as somewhat of a novelty. Ten years ago its utility as an important repair and reclamation device was conceded generally. Five years ago it already was widely accepted as a major production tool. Today manufacturers literally have been forced to turn to welding and cutting in many lines where these processes have rendered older methods entirely obsolete.

Progress in oxyacetylene welding and cutting in the United States during the past year has been marked by many notable introductions of new applications, methods and apparatus. Startling and even revolutionary recent discoveries have been investigated eagerly and adopted by industry wherever possible, resulting in new economies in operation, production and maintenance.

A recent article on the manufacture of the Ford V-8 stated there are 3415 welds including electric spot, flash, arc and oxyacetylene on the car and that more than 1000 oxyacetylene welding and cutting torches were in use in the Rouge plant alone. The considerable increase in oxyacetylene welding employed in the construction of welded all-steel automobile bodies has been one of the outstanding recent developments.

Useful in Modern Design

One of the principal factors working to greatly increase the use of welding and cutting in recent years has been the widespread modernization of American products. Today's demand is for straight lines or stream lines. Fortunately, when the new call for industrial beauty rang out, there was a new process available which fitted into the picture perfectly—namely, the oxyacetylene process. Welded seams and cut edges are smooth enough for many purposes without further finishing, but can be ground smooth and entirely concealed where necessary. Furthermore, welding and cutting meet all three dimensions of industrial design—appearance, cost and durability.

The oxyacetylene process largely is responsible for lighter-weight machines and products. Greater strength is obtained even where sections used are thinner.

Another notable development in recent years, from the standpoint of the fabricator, is that of the so-called low-alloy high-tensile steels, with yield points and ultimate strengths nearly double that of low-carbon steel. Entirely new fields are opening because of these steels. The possibilities of welded construction incorporating them have just begun to be realized.

Undoubtedly the largest single application of low-alloy high-tensile steel thus far was in the penstocks for Boulder dam. These penstocks ranged from 13 to 30 feet diameter. Over 45,000 tons of rolled steel plates, ranging in thickness from ⅝-inch to 4½ inches were required for their construction. These plates were prepared for welding by oxyacetylene machine cutting. In many cases, the cutting was done after the plates were formed into irregular curved shapes to be welded without further finishing.

THE accompanying article will be presented at the thirty-sixth annual meeting of the International Acetylene association, Cleveland, Nov. 12-15. The author, E. V. David, is associated with the applied engineering department, Air Reduction Sales Co., New York

Welding and metallurgical engineers have co-operated in developing suitable welding techniques for new metals and alloys produced. Makers now recognize that welding is one of the methods most widely accepted by the fabrication industries and that weldability is one factor which cannot be overlooked. Similarly, co-operation between the users and the oxyacetylene industry has resulted in development of suitable oxyacetylene cutting techniques for many of the newer alloy steels.

Research Proves Value

The relative efficiency of various other fuel gases as compared with acetylene for welding and cutting has received considerable further study which so far has served to accentuate the inherent superiority of acetylene for these purposes. Additional fundamental research on the effect of flame cutting on steel has been conducted.

A survey of present-day torches or blowpipes will show that they are becoming steadily more compact, lighter, better balanced, more skillfully proportioned and more precisely machined. There is a decided tendency to make them more adaptable to various types of work, thus giving them greater all-around utility. They are several torches in one, as it were. Further improvement in tips are noted. The tendency to provide torches, which will permit greater production per man hour, continues.

Regulators of the 2-stage type have retained their deserved popularity. They give much more accurate regulation of the pressure and volume of gases used in all oxyacetylene operations which affords better quality work. Considerable developments have occurred recently in acetylene generators of all capacities and types. Many of the new models have been tested and accepted by Underwriters Laboratories at the double rating for generating capacity.

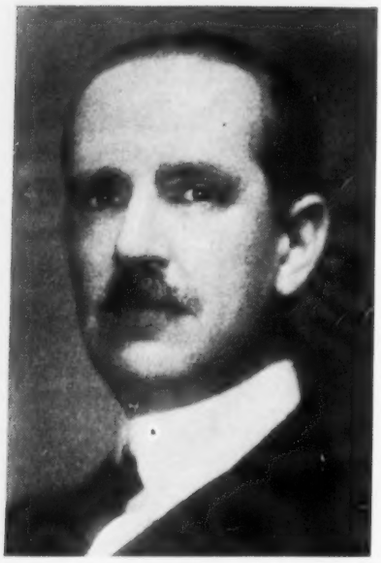
More Piping Welded

Oxyacetylene welding of pipe insures strong, leakproof, permanent joints and the excellent past performance of welded pipe has made an extremely favorable impression on industry generally. Oxyacetylene welded piping is equally advantageous for cross country transmission pipe lines and piping for every service in buildings and industrial plants. It especially is preferred for the higher pressures and temperatures used in modern steam and process piping.

Modernization of plant process piping is a vital consideration in the interests of low operating cost. The efficient flow of water, steam, air, chemicals and materials being processed through oxyacetylene welded piping has led to many recent installations of this type. To resist certain types of corrosives, fabricated copper pipe with bronze welded longitudinal seams and girth joints is being used to an increasing degree.

Another modernization program that may be expected to assume considerable importance in the near future is the increase in the number of installations of up-to-date domestic heating and air conditioning units. Oxyacetylene welded piping is ideal for this work.

Bronze welding of ferrous metals is another oxyacetylene application which has continued to forge to the forefront. For heavy maintenance and repair work particularly, bronze welding, in many cases, has turned the spectacular into the routine.



Philip Kearny
President, International Acetylene association

Much of this work now is done with local preheating only.

Oxyacetylene welding of stainless steels has shown considerable progress. Satisfactory techniques now have been developed for welding nearly all of these materials. Wherever possible the manufacturers detailed instructions should be obtained before welding is started, however, and the proper procedure as indicated carefully followed.

Progress made in many other applications of oxyacetylene welding during the past year has been just as marked. Equally as deserving of mention is the progress made in welding nonferrous metals such as copper, brasses, bronzes, nickel, Monel, aluminum and others as well as numerous newly developed alloys.

Decade of Hard-Facing

One important process which celebrated its tenth anniversary during the past year is hard-facing. This first was introduced in oil fields in 1924 and has enjoyed a decade of remarkable progress. Long regarded primarily as a maintenance process for salvage and repair of parts, it now is recognized as a valuable production method as well. Cost-reducing features contributing to the popularity of hard-facing are longer life for equipment, fewer replacements and resulting savings in labor charges and loss of time, utilization of cheaper base metal where design incorporates hard-facing, salvage or reclaiming of worn parts, savings in power consumption and general increase in operating efficiency.

Hard-faced automobile exhaust valve seats afford an excellent example of the advantages of this process. These are removable steel inserts with hard-facing applied to the beveled or flat seating surface. Ordinary cast-iron valve seats for heavy-duty trucks and buses must be ground every 10,000 miles. Tests have proved that the hard-faced valve inserts will operate for 10 to 20 times this mileage without regrinding.

Silver soldering now can be used on practically all ferrous and nonferrous metals and alloys having melting points above 1200 degrees Fahr. They are obtainable in sheets, strips, wire and any other form required for different sizes and types of joints. Their free-flowing properties and relatively low melting temperatures allow engineers to design joints with small clearances which will have great strength and ductility and will withstand severe shocks and bend stresses.

Recently developed brass pipe fittings of standard iron pipe sizes, but unthreaded and fitted instead with a ring of silver solder that gives a strong leakproof permanent joint have proved popular.

Metal Spraying Progresses

Possibly the most important present day use of the oxyacetylene flame aside from welding and cutting is for metal spraying. In this process, oxyacetylene flames are used to fuse the metal in wire form as it emerges from the nozzle of the gun. A powerful compressed air jet atomizes the molten metal and impacts it with great force on the surface to be coated. Rapid progress has been made recently in wider use and new applications of metal spraying. Spray guns of greater capacity and improved operating characteristics have been developed.

The oxygen lance continues to find increased uses for tapping furnaces, cutting salamanders and similar applications. The hand cutting torch continues to be one of the most widely used tools in the metalworking industries. Profound changes have been wrought by its introduction.

Turning now to machine gas cutting, we find changes continuing to take place that give promise of greatly extending the usefulness and economy of this extremely versatile process. This "metal carpentry" or "tailoring" is laden with possibilities for improving design, speeding up production and effecting major economies in the making of steel parts of every description, and in the modern practice of welded fabrication where it acts as a companion process to welding.

Machine gas cuts are accurate and can be made to close tolerances. They have sharp corners and edges and compare favorably with a roughing cut made by a planer or shaper. They are good enough to be used without extra machining on any job that would not ordinarily call for a machine finish. Machine gas cut parts virtually "fall into place" in an assembly. These machines make parts in a fraction of the time that would be required to produce them by other methods and at a fraction of the cost.

Stocks in steel warehouses today tell the story of the modern trend to welded steel plate construction most convincingly. Demands of their customers have created entirely new inventory requirements. They now carry plates and slabs up to 8 inches thick; also complete stocks of structural sections and bars.

Boon to Scrap Yards

Particularly in recent times, one of the principal uses of the cutting torch has been for scrapping. That pile of discarded junk lying in the hidden backyards of thousands of plants often has been found to yield unsuspected and surprising salvage. By welding and cutting, worn and broken parts are reclaimed and returned to service or stock. Others are converted into jigs, dies, fixtures and many other usable articles.

Obsolete steel equipment and structures of all types also are scrapped or demolished with cutting torches to standard charging box size and the materials classified and sold at a profit. The extensive car and locomotive scrapping program of the railroads carried out during the past few years has furnished a good example of this. Oxyacetylene cutting has put steel scrapping on a profitable basis.

The formulation and adoption of suitable codes and specifications for oxyacetylene welding and cutting in various fields have proved most ad-

C. O. Epperson
Vice President, International Acetylene association

vantageous in securing general recognition and acceptance of these processes. During the past year, substantial headway in this respect has been achieved. The more important codes and rules issued recently were:

1. American Welding society tentative recommendations describing procedure to be followed in preparing for welding and cutting certain types of containers which have held combustibles.

2. American Welding society marine code for welding and gas cutting—Part D.

3. Code for fusion welding and gas cutting in building construction—Part 8—Structural Steel, edition of 1934.

4. A tentative code for fusion welding and flame cutting in machinery construction.

5. Code for pressure piping, sponsored by the American Society of Mechanical Engineers and approved by American Standards association. Section 5 starting on page 3, covers welding pipe joints.

6. Rules for the fusion welding of gravity tanks, tank risers and towers were prepared by a joint committee of the American Welding society and the International Acetylene association at the instance of the National Board of Fire Underwriters Engineering council. Undoubtedly, these rules are of the greatest importance to the welding industry, to heating and piping contractors and to those designing or owning buildings.

7. The International Acetylene association issued two pamphlets entitled "Test for the Selection of Operators of Welding Equipment" and "Model Purchase Specifications for Welding Piping" which come under this category. These were prepared by the oxyacetylene committee.

8. The boiler code committee of the American Society of Mechanical Engineers proposed changes in the A.S.M.E. boiler code providing further use of oxyacetylene flame cutting for the preparation of steel plate edges in steel of up to 0.35 carbon content for boiler and pressure vessel fabrication work. This is one of the most significant recognitions that the oxyacetylene process has received recently.

H. F. Reinhard
Secretary, International Acetylene association

Last year, the directors of the International Acetylene association approved the issuing of separate pamphlets covering the various important phases of the oxyacetylene process. These replaced the single general booklet containing the oxyacetylene committee report compiled annually up to that time. Four pamphlets were published last year and met with good success. They have proved of considerable value as text or reference books.

This year, the work of the oxyacetylene committee has continued to be directed along similar lines. Three additional pamphlets on pertinent technical subjects have been prepared and publication authorized by the directors.

The first pamphlet is entitled "Tests for the Selection of Operators of Welding Equipment." It was prepared to fill what appeared to be a long-felt want of contractors and job shop owners generally for some simpler and more economical method for selecting welding operators to be employed on noncode work than the qualification tests in the codes.

Pipe Specifications Issued

The second pamphlet carries the title "Model Purchase Specifications for Welding Piping." These have been compiled to meet the general demand of architects and engineers for specifications covering the welding of pressure piping to be incorporated in any general specifications. They are in short, condensed form and refer to the code for pressure piping of the American Standards association for installations coming under its provisions.

The third pamphlet is called "Bronze Welding or Hard-Brazing of Cast Iron and Malleable Iron by the Oxyacetylene Process." We have already referred to the growing importance of bronze welding, which, the oxyacetylene committee felt, justified the preparation of a special publication on the subject this year.

Last, but not least, we have our fourth subject for this year, entitled "The Effect of Flame Cutting on Steel." Considerable fundamental research in this field recently has been carried out and a number of valuable technical papers giving the results are presented. The oxyacetylene committee felt that a special pamphlet summarizing the highlights of these findings on low-carbon nonalloy steels would prove helpful in the further promotion of the process at this time. Not withstanding the recognition of flame cutting as a satisfactory fabricating process by the A.S.M.E. boiler code committee and other important bodies, it would appear that there still remains a certain distrust of it in the minds of some people who have not been in close touch with it. It is hoped this pamphlet, which will be published later, will held to dissipate their fears.

Henry Booth
Treasurer, International Acetylene association

As general chairman of the oxyacetylene committee for this year, I feel it would be much amiss if I did not acknowledge at this time my grateful appreciation of the splendid co-operation and assistance in every phase of the work which have been rendered by all the members of the committee. Acknowledgements are due also to another group of individuals who, while not members of the committee, have given of their time and effort without stint in contributing to the preparation of the pamphlets. I feel certain I am expressing the sentiment of the entire membership in thanking all concerned for their good work.

To conclude a progress report on the oxyacetylene industry with an optimistic note offers no difficulty. For example, an interesting survey of machinery requirements for modernization of American plants was completed recently by the Machinery and Allied Products institute. This indicated that a huge pent-up demand had accumulated during the years of the depression as a result of deferred purchases. New machinery costing 18½ billions of dollars would be needed to modernize American industry, the estimate showed. As this great dam is unloosed, the oxyacetylene industry surely will be among the first to benefit from it.

LINDE PROCESS SERVICE CAN HELP YOU TOO

(Below)

On Pipe Lines— Multi-Flame Linde-welding has stepped up production 50 per cent in the construction of overland pipe lines for oil, gas and gasoline.

(Left)

In Fabrication—Six 3,000-gallon aluminum tanks were oxy-acetylene welded by a large chemical company assisted by Linde Process Service.

No matter what your welding or cutting project may be, the wealth of experience of the Linde organization can be helpful to you in getting the maximum benefit from your use of the oxy-acetylene process. The closely coordinated laboratory, development and field engineering facilities of the Linde organization are at your service. Linde Process Service continuously translates proved methods into terms of actual plant requirements and saves money for Linde users.

What Is Process Service?

Linde has been helping its customers use the oxy-acetylene process of welding and cutting effectively and profitably ever since it has been in business. The Linde service organization is made up of men who have specialized in the oxy-acetylene process, men whose advice, based on broad experience, can be relied on for routine work or emergencies, and who can train operators in correct procedures. The Linde service organization is at your call the moment you need help. When a job is too complicated for the welding and cutting experience of your own men, this organization will show you whether or not to use welding, and how to use it; how to save money and how to make money with it.

Profit By Past Experience

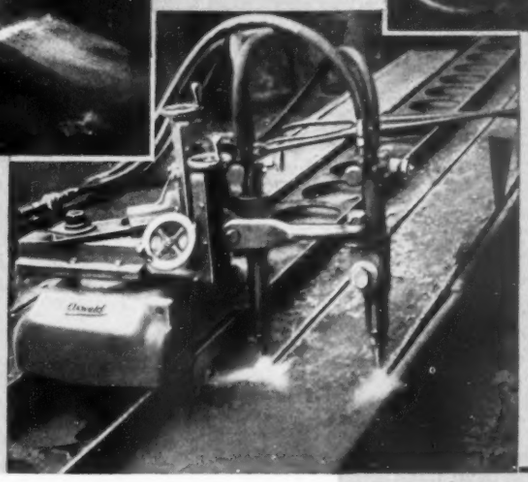
Linde's experience is cumulative and goes back to the very beginning of the welding industry. Linde can help you get more out of your welding and cutting operations, regardless of how good your operators are. Even your best operator may hesitate to tackle a job which, if unsuccessful, might mean a considerable loss to your company. If this involved an expensive piece of machinery, you would be faced with an expenditure for replacement, and perhaps an even greater loss through partial shut-down of operations. Linde meets this situation by providing you with a Linde Service Operator who will not only see

(Below)

For Machine Cutting—Automatic oxy-acetylene machine cutting is increasingly used to fabricate heavy steel parts. The Oxweld Monitor using two blowpipes makes a smooth and true kerf in cutting a steel slab.

(Left)

In Production—More than 50 oxy-acetylene welds are involved in the production of the automatic refrigerator for which this operating unit is being made.



(Above)

In Repair—Several thousand dollars were saved by a fruit packing plant by welding this broken journal box on an obsolete make of ammonia compressor.

(Right)

Industrial Piping—12-gauge copper pipe fabricated by bronze-welding. View shows 6 in. 45 deg. branch from paper stock filter to 10 in. return line.

that the job is done satisfactorily, but will instruct your own operators, so that they will be prepared to handle future emergencies of the same kind themselves without assistance.

Ask For A Movie Showing

Ask the nearest Linde Sales Office to arrange to show some of the Linde motion pictures before members of your organization. These motion pictures show outstanding examples of the oxy-acetylene process and Linde Process Service in all industries and on all classes of work. The Linde Sales Office will be glad to arrange to show you one or more of the films which pertain to your welding and cutting projects.

Linde Process Service is Available Everywhere

This map showing Linde's manufacturing and distribution facilities indicates the wide availability of Linde Process Service. When a Linde man enters your plant to help you, he brings with him the full background of experience of the whole Linde organization. He is the representative who brings to you the benefit of years of metallurgical research conducted by the laboratories, the correct procedures for applications of the process developed by the Linde Process Development Division, and, most important of all, the experience of thousands of other users of the oxy-acetylene process in all parts of the United States. You can obtain this help by communicating with the nearest of the 30 Sales Offices located in principal cities or 30 East 42nd Street, New York, N. Y. Address: The Linde Air Products Company, Unit of Union Carbide and Carbon Corporation.

Everything for Oxy-Acetylene Welding and Cutting

LINDE OXYGEN • PREST-O-LITE ACETYLENE • OXWELD APPARATUS AND SUPPLIES

FROM PRODUCTS OF UNITS OF UCC UNION CARBIDE AND CARBON CORPORATION LINDE UNION CARBIDE

Industry's Leaders Have Guided Actylene Association

BY JOHN MOTLEY MOREHEAD
Past President, International Acetylene Association

ONE OF the major objectives of the International Acetylene association since its inception in 1898, has been to represent the acetylene industry in the matter of obtaining proper regulations governing the use of acetylene in its varied applications.

In the early days of the association's activities, the primary consideration was to secure proper regulations governing the storage of calcium carbide, the utilization of acetylene generators for house-lighting, and the cap lamp for miner's use. As the commercial development of the use of acetylene extended, other uses of acetylene became of even greater importance, particularly the manufacture of dissolved acetylene and the use of acetylene for oxyacetylene welding and cutting.

The importance of these considerations has necessitated an unusually high degree of leadership on the part of the officers of the association. The conduct of the affairs of the association from its inception, has been in the hands of responsible men who have been leaders in the industry. Presidents of the International Acetylene association follow:

G. L. Wilson (1898-1900) (1901-02)—First President of the association. A pioneer manufacturer of acetylene lighting generators.

Raphael Herman (1900-01)—President, Herman Acetylene Company, Indianapolis, manufacturer of acetylene generators.

J. B. Carroll (1902-03) (1903-04)—Established business in Chicago as an early pioneer in the manufacture of burners which made the utilization of acetylene for lighting purposes more practical.

Augustine Davis (1904-05)—Feunder of the Davis Acetylene Company, Elkhart, Ind., which manufactured one of the first approved acetylene generators for lighting. Later organized the Davis-Bournonville Company, Jersey City, N. J., to manufacture apparatus for oxyacetylene welding and cutting. Developed one of the first medium pressure generators suitable for use with early oxyacetylene blowpipes. Recipient of Morehead Medal for 1925.

G. W. Mead (1905-06)—One of the founders of Union Carbide Company. Later vice president and director, Union Carbide & Carbon Corp.

H. I. Gannett (1906-07)—President, Monarch Acetylene Gas Company, Omaha, Nebr. One of the first to build an approved type of acetylene houselighting generator.

A. C. Einstein (1907-08)—President, Eagle Generator Co., St. Louis.

M. J. Carney (1908-09)—One of the founders of the Acetylene Apparatus Manufacturing Company, Chicago, and subsequently of Oxweld Acetylene Company and The Oxweld Railroad Service Company. Now vice president and director, Union Carbide & Carbon Corp.

O. F. Ostby (1909-10)—Connected with Commercial Acetylene Company, New York. Instrumental in utilizing acetylene for railroad headlights and railroad car lighting.

B. O'Shea (1910-11)—President, Union Carbide Sales Company and subsequently of Union Carbide Company. Now vice president and director, Union Carbide & Carbon Corp.

A. C. Collins (1911-12)—Secretary-treasurer, Davis Acetylene Company, Elkhart, Ind.

P. A. Rose (1912-13)—President, J. B. Colt Company, New York.

M. Kirchberger (1913-14)—President, M. Kirchberger & Company, New York. One of the leading manufacturers in the United States of acetylene burners.

Sponsored Many Investigations

J. M. Morehead (1914-15) (1915-16)—Son of James Turner Morehead, who sponsored the investigations which resulted in the first production of calcium carbide on a commercial scale. Present at Spray, N. C., where carbide was first made. Installed first carbide furnaces in the United States and later in England. Consulting Engineer, Peoples Gas Company, Chicago, Union Carbide Company, The Linde Air Products Company, and The Prest-O-Lite Company, Inc. Recently United States Minister to Sweden. Founder of the Morehead Medal.

A. F. Jenkins (1916-17)—Connected with Alexander Milburn Company, Baltimore. Developed what are known as water lights and marine flares, and later became leading manufacturer of acetylene generators and blowpipes for oxyacetylene welding and cutting.

J. T. Earl (1917-18) (1918-19)—Partner of Augustine Davis. In charge of operations of the Davis Acetylene Company, Elkhart, Ind.

H. S. Smith (1919-20) (1920-21)—Took over first carbide furnace installed by Mr. Morehead in England at the end of 1896. Then engaged in operation of commercial acetylene and carbide plants in Great Britain and Scotland. Responsible for the first introduction into England of dissolved acetylene in 1901, followed by the first use of oxyacetylene welding in England in 1902. Past President of British Acetylene Association. Came to this country in 1911 as Chief Engineer, The Prest-O-Lite Company, Inc.

J. A. Johnson (1921-22)—President, Johnson Acetylene Company, Crawfordsville, Ind. Manufacturer of one of the best known acetylene generators of the low pressure type.

David Ahldin (1922-23)—Official of Commercial Acetylene Company, Chicago. One of the world's authorities on acetylene for marine use. Associated with Nils Gustaf Dalen, recipient of Morehead Medal for 1931.

E. L. Davis (1923-24)—Leading manufacturer of heavy acetylene-consuming devices such as ovens and stoves.

W. S. Noyes (1924-25)—Representative of Imperial Brass Manufacturing Company, Chicago, one of the leading makers of oxyacetylene equipment.

R. A. Sossong (1925-26)—One of pioneers in the use of dissolved acetylene with the Searchlight Gas Machine Company, Chicago, which was later absorbed by the Air Reduction Co. Inc.

W. A. Slack (1926-27)—President, Torchweld Equipment Co., Chicago.

L. E. Ogden (1927-28)—Vice President, Oxweld Acetylene Company, Newark, N. J.

L. F. Loutrel (1928-29)—Manager of United States division of the Canada Carbide Company, Ltd., and Shawinigan Products Corporation, Shawinigan Falls, Quebec.

C. A. McCune (1929-30)—First entered into the compressed gas industry with the Pintsch Gas Company and later became engineer with the Commercial Acetylene Company.

W. D. Flannery (1930-31)—Harris Calorific Sales Company, New York.

W. C. Keeley (1931-32)—Vice President, National Carbide Corporation, New York.

E. J. Hayden (1932-33)—Manager, Central Division, The Linde Air Products Company, Chicago.

H. B. Pearson (1933-34)—President, Compressed Industrial Gases, Inc. Chicago.

Philip Kearney (1934-35)—Associated with Gallaway, well-known equipment manufacturer. Present President of the Association and of the K-G Welding & Cutting Co., New York.

It should be appreciated that the primary activities of the Association have been the safeguarding of the industry, through the proper promulgaton of laws and regulations governing the industry, through the investigation of accidents with a view to making recommendatons to prevent recurrence of such accidents, through assistance in the promulgation of codes and regulations concerning the proper utilization of oxy-acetylene welding and cutting.

Cleveland Appropriate City For 36th I. A. A. Convention

ONE week from tomorrow, Tuesday, Nov. 12, the International Acetylene association will open its 36th annual meeting at the Cleveland Hotel, Cleveland. Officers of the association extend a cordial invitation to any person interested in the oxyacetylene process of welding or cutting to attend every session, to derive from well-known and able speakers valuable and useful knowledge, and to participate in all the discussions. There will be no registration fee for any of the sessions. In general, preprints of all papers will be available at the close of the session and can be obtained at the association's press room, Hotel Cleveland.

Only a few years elapsed between the accidental discovery of a commercial method for the manufacture of calcium carbide and acetylene and the formation of the International Acetylene association in 1898. There is probably no technical or scientific society in the world whose existence so closely parallels the life of the industry which it serves.

During the years, the International Acetylene association has seen the use of acetylene and calcium carbide develop from its first application for lighting through the unbelievable growth of the oxyacetylene process to its present additional importance in the field of synthetic chemistry. The association has kept pace constantly with the amazing developments in its industry and offers here, at its 36th annual convention, not only sound discussions of the problems facing the industry at this time, but, in addition, a vision of the future which lies ahead of the industry and the organization which serves it.

Process Described in 1907

The first technical paper presented in the United States on the oxyacetylene process of welding was read before the association in 1907. In 1928, one of the earliest published resumes of the use of acetylene as a basis for chemical synthesis was offered at the association's annual meeting. To maintain the leadership evidenced by such events, the association will continue to present discussions of new and important questions concerning its industry.

One of the highlights for the meeting will be the presentation of an industrial drama in four acts entitled "Profits of Progress." The drama will be staged in the Music Hall of the Cleveland Public Auditorium, Sixth street and Lakeside avenue. The play for this evening is unique in the history of technical society meetings, while at the same time offering sound and valuable information on the oxyacetylene process. Tickets for advance distribution can be obtained from the I. A. A. convention headquarters at Hotel Cleveland. A synopsis of the play is on page 88.

Forum Is Introduced

Wednesday evening, Nov. 13 in the auditorium of the Brotherhood of Locomotive Engineers building, 1370 Ontario street, a welding and cutting forum will open at 8:15. The program has been developed by selecting those questions that have been most often asked of the association's technical committees and of the engineering representatives of the association's members, particularly in the area of greater Cleveland. This session, which has been divided into three parts, namely, Materials Used in the Oxyacetylene Process, Safe Practices in Using the Oxyacetylene Process, and Testing Welds and the Welded Structures, will prove profitable to superintendents of welding, foremen and welders, as well as to proprietors of welding shops and other executives directly interested in the application of efficient welding and cutting methods.

Hotel Cleveland at right which adjoins Terminal Tower

Cleveland, the sixth city in population in the United States, historically, geographically, and upon its merits as an iron and steel city commends itself as a meeting place for men engaged in the gas cutting and welding industries.

Traveling by water was easier than it was by land in the days when General Moses Cleveland and his party of surveyors crossed the wilderness and separated the Atlantic states from the vast unexplored territory known as the Western Reserve on the south side of Lake Erie. The arduous trip was made the greater part of the way by boat and involved some long and difficult portages including that around the rapids and awe-inspiring falls of the great Niagara. Coasting along the southern shore of Lake Erie for a suitable landing place and a site for a settlement, the General discovered the mouth of the Cuyahoga river and in July 22, 1796 formally established a settlement.

Used As a Trail

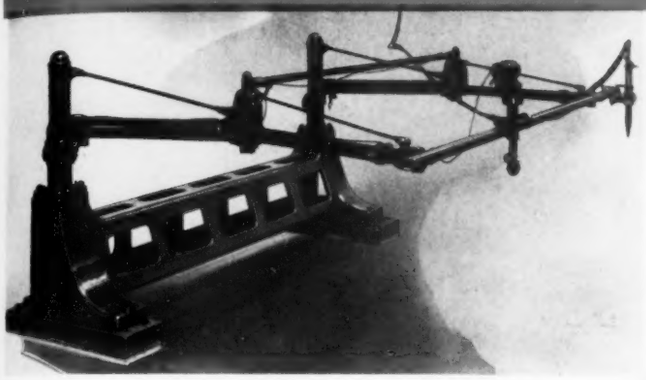
Euclid avenue, the nationally known thoroughfare and great retail shopping district, originally was a buffalo trail leading east and west, high and dry above the level of the adjacent lake. It also served as a war trail for the roving tribes of Indians, and, closely following the indentations in the shore extended from the site of the present city of Detroit on the west to where Buffalo, once known as the Queen City of the Lakes, now guards the outlet of the waters from Lake Erie.

Starting in 1800 with a population of 25, the village had grown to 300 by 1810 and after that the population increased rapidly. For example, it jumped from 1075 in 1813 to 6071 in 1820 and then approximately doubled every ten year period up to 1890 when the census showed a return of 261,353. In 1900 the population was given as 381,768, in 1910 it was 560,663, and in 1920 when the official census was taken the population of the city was given as 796,836. At the present time the population of Cleveland, including that in a few, as yet unannexed, suburbs is about one million. At the time the city was founded the value of $1,200,000 was placed on the 3,-

Flame Cutting with AIRCO-DB Gas Cutting Machine

PIONEERS In developing OXYACETYLENE CUTTING PRACTICE and MACHINES

·Write Today for the folders describing these machines·

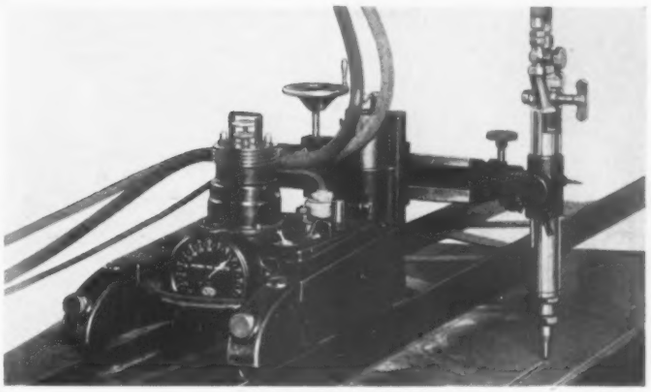


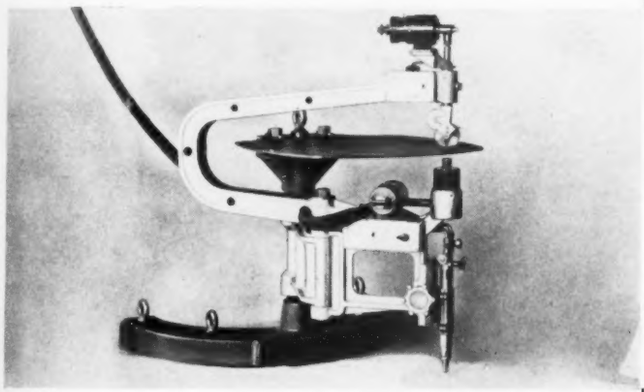
No. 6 OXYGRAPH

Cuts rolled sheets, plate, slabs, forgings or billets in any thickness practicable for machine gas cutting. Operates on the pantograph principle. For simultaneous multiple cutting, two to four torch holders and torches may be mounted on the bar. Cutting range is given in descriptive pamphlet, copy on request.

No. 4 RADIAGRAPH

Cuts straight lines of any length, running on steel tracks. Cuts arcs or complete circles with radius rod and center point. Cuts to templet or guide when equipped with Side-Roller attachment. Available also is a Two-Torch Holder Attachment for simultaneous parallel cutting and an I-beam Splitting attachment. Descriptive pamphlet on request.



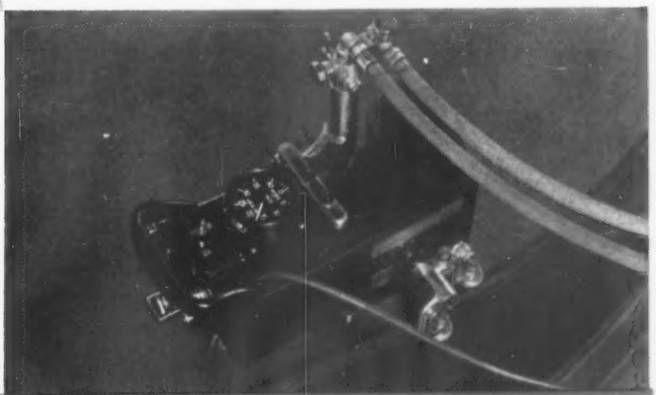


No. 1 OMNIGRAPH

Automatically reproduces from cam or templet by means of motor-driven magnetic tracing device, or with a motor-driven ***manually controlled*** tracing device. Thus in addition to automatically reproducing in quantity from cam or templet, it serves as an economical means of cutting special pieces from a simple outline drawing where the making of a cam is not warranted. Descriptive pamphlet on request.

No. 1 TRACTOGRAPH

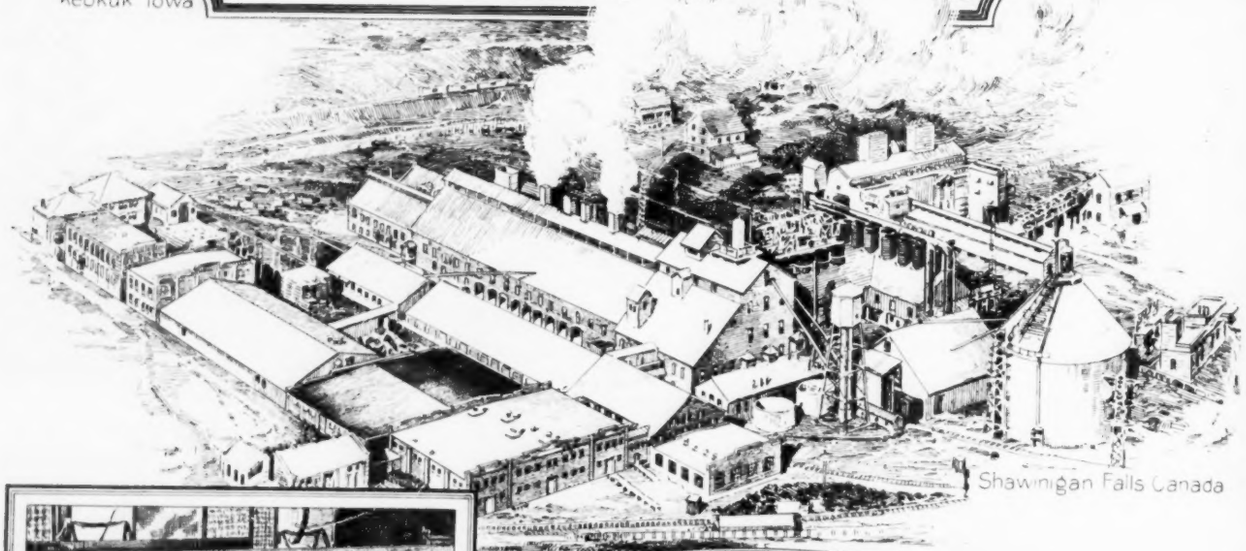
A portable, motor-propelled, hand guided machine containing an entirely new principle in cutting machine drive, for accurately cutting steel plates and slabs into straight, circular or irregular outlines and extending over practically unlimited areas. Cuts beveled as well as perpendicular edges. Descriptive pamphlet on request.



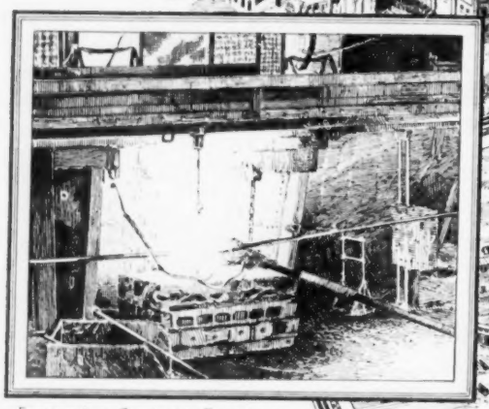
AIR REDUCTION
SALES COMPANY

General Offices:
60 EAST 42nd STREET
NEW YORK CITY

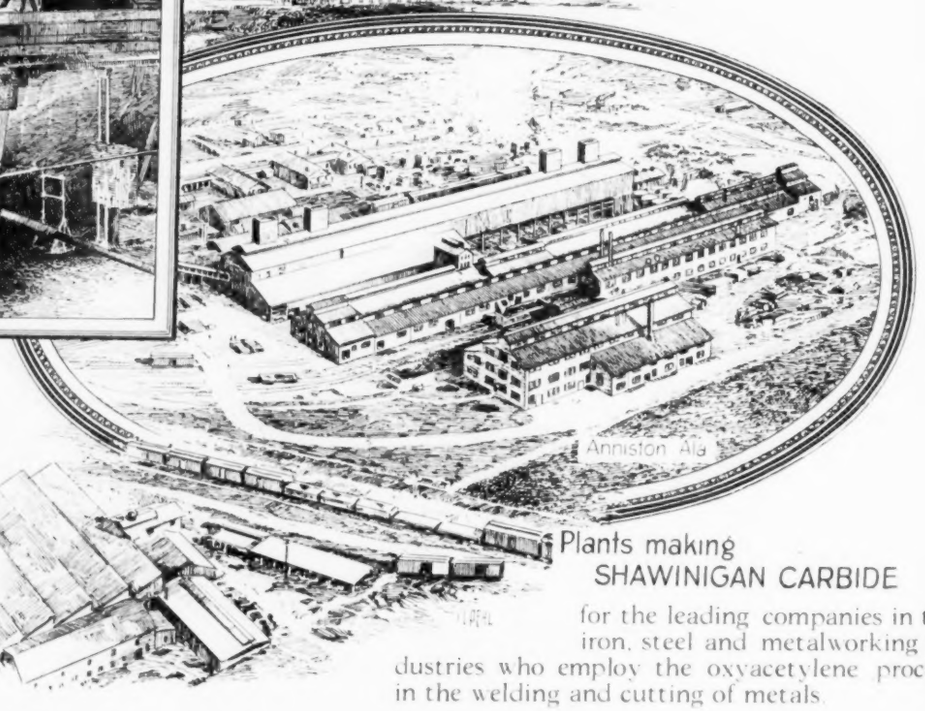
Keokuk Iowa



Shawinigan Falls Canada



Tapping a Carbide Furnace



Anniston Ala

Plants making
SHAWINIGAN CARBIDE

for the leading companies in the iron, steel and metalworking industries who employ the oxyacetylene process in the welding and cutting of metals.

SHAWINIGAN

SHAWINIGAN PRODUCTS CORPORATION

EMPIRE STATE BLDG. NEW YORK CITY

600,000 acres of land comprising the eastern part of the Western Reserve.

Cleveland owes its rapid growth and dominating position to its favorable geographical location at a point where several great trade routes cross each other. The water-borne commerce of the Great Lakes converges to this city, the nearest point on the south shore of Lake Erie to the vast coal deposits of Pennsylvania. Railroad builders noticed with approval the easy and direct grades routing east, west, and south from Cleveland and the railroads, possibly more than any other single factor, are responsible for the prestige enjoyed by the city as a great manufacturing and distributing center.

Other natural advantages that combine into the same end are the extensive area of level land surrounding the city on three sides, providing room for easy industrial expansion; the lake on the fourth side offering low freight rates and ready means of transportation east, west and north, and the fact that this is a central point between the vast ore deposits of the northwest and the fuel from the southern Ohio and Pennsylvania coal fields.

During the recent war the claim was made for the city that it could make in part or entire, in many instances, every single piece of war equipment from the tiniest screw of a range finder to the cargo boats of the emergency fleet corporation. The boats were designed, laid down, erected, equipped, launched and loaded in Cleveland yards and then dispatched under their own steam through the inland waterway leading to the Atlantic ocean.

In connection with the shipping industry, it is interesting to note that vessels have been built in the district almost since its inception as an industrial community. A 30-ton schooner was built at the mouth of the Cuyahoga river in 1808 and six years later a second schooner twice as large as the first was launched at

Program of

International Acetylene Association

Tuesday, Nov. 12

9:00 A. M.—Hotel Cleveland

Registration.

10:00 A. M.—Hotel Cleveland

Address of Welcome, by Dr. W. E. Wickenden, president, Case School of Applied Science, Cleveland.

Keynote Address, by Merle Thorpe, editor, *Nation's Business*, Washington.

President's Address, President Philip Kearny, New York.

"Twelfth International Acetylene Congress, London, 1936," by A. B. Harrower, British Oxygen Co., Ltd., London, England.

"Acetylene in the Chemical Industry," by A. F. G. Cadenhead, chief of plant research department, Shawinigan Chemicals Industry, Ltd., Shawinigan Falls, Quebec.

Presentation of Morehead Medal, H. B. Pearson, past president, International Acetylene association, Chicago.

Acceptance of Morehead Medal, W. C. Bucknam.

2:00 P. M.—Hotel Cleveland

Safety

"Reports of Legislative and Insurance Committee and of the Technical and Engineering Committee," by H. S. Smith, Chairman, executive committee, International Acetylene association, New York.

"Prevention of Welding and Cutting Fires," by C. D. Abbott, district manager, Associated Factory Mutual Fire Insurance Companies, Cleveland.

"Safe Handling, Storage and Return of Compressed Gas Containers," by F. R. Fetherston, secretary, Compressed Gas Manufacturers association, New York.

"Studies in Industrial Health of Interest to the Oxy-Acetylene Industry," by W. P. Yant, superintendent, experiment station, United States bureau of mines, Pittsburgh.

Discussion.

8:15 P. M.—Music Hall, Public Auditorium

Profits of Progress

(An Industrial Drama in Four Acts)

By Wilfred Burglund

Wednesday, Nov. 13

2:00 P. M.—Hotel Cleveland

Metallurgy of Welding and Cutting

"Welding and Cutting of High Chromium Steels," by W. J. Priestley, vice president, Electro Metallurgical Co., New York.

"Further Studies of Oxy-Acetylene Cut Steel Plate," by Prof. J. H. Zimmerman, Massachusetts Institute of Technology, Cambridge, Mass.

"Hydrocarbon Fuel Gases for Cutting," by Dr. G. Slottman, Air Reduction Sales Co., New York.

"Gas Welding Aluminum and Its Alloys," by G. O. Hoglund, supervisor of welding, Aluminum Co. of America, New Kensington, Pa.

Discussion.

8:15 P. M.—Brotherhood of Locomotive Engineers Auditorium

Welding and Cutting Forum

Materials Used in the Oxy-Acetylene Process: Their production, qualities and uses.

Oxy-Acetylene Cutting—Theory and Practice: Hand Cutting, Machine Cutting, and the Oxygen Lance.

Identifying Metals to Be Welded: Dr. A. B. Kinzel, chief metallurgist, Union Carbide & Carbon Research Laboratories Inc., and chairman, iron and steel division, American Institute of Mining and Metallurgical Engineers.

Demonstrations and Explanation of Certain Recent Welding Techniques.

Safe Practices in Using the Oxy-Acetylene Process: J. I. Banash, past president, National Safety Council, and consulting engineer, I. A. A.

Testing Welds and the Welded Structure: J. J. Crowe, president, American Welding society, and engineer in charge, apparatus research and development dept., Air Reduction Sales Co., New York.

Thursday, Nov. 14

12:00 Noon—Hotel Cleveland

Annual Luncheon and General Business Session

Report of Oxy-Acetylene Committee, by E. V. David.
Report of the Consulting Engineer, by J. I. Banash.
Report of the Secretary, by H. F. Reinhard.
Report of the Treasurer, by Henry Booth.
Report of Auditing Committee, by M. M. Smith.
Report of Membership Committee, by Henry Booth.
Report of Resolutions Committee, by L. E. Ogden.
Report of Nominating Committee, by E. L. Davis.
Election of Officers.

2:00 P. M.—Hotel Cleveland

Piping and Pressure Vessel

"High Pressure Piping," by J. I. Freiday, mechanical engineer, T. J. Murray, Inc., New York.

"Welding Class I Pressure Vessels," by G. W. Plinke, director of research, Henry Vogt Machine Co., Louisville, Ky.

"Welded Piping and Pressure Vessels in the Marine Field," by J. W. Wilson, engineer, bureau of navigation and steamboat inspection, Department of Commerce, Washington.

"Permanency of Oxy-Acetylene Welding," by F. C. Hutchinson, engineer, Linde Air Products Co., Kansas City, Mo.

Discussion.

Friday, Nov. 15

2:00 P. M.—Hotel Cleveland

Transportation

"Maintenance-of-Way Problems in High-Speed Transportation," by A. Chinn, chief engineer, Chicago & Alton Railroad, Chicago.

"Oxy-Acetylene Process in Maintenance-of-Way Work," by L. J. Turner, chief rail inspector, Chicago, Rock Island & Pacific Railway Co., Chicago.

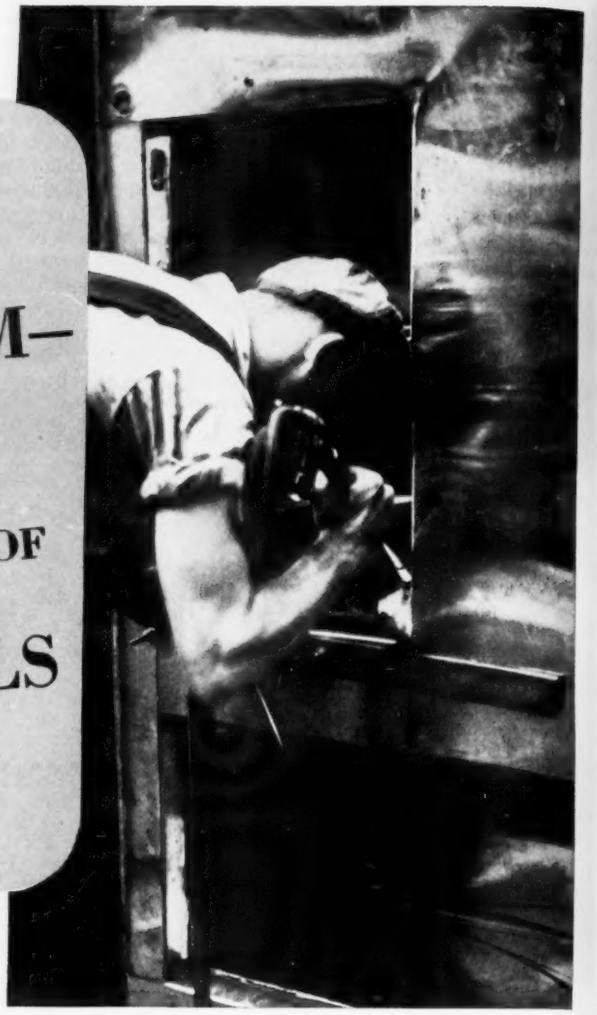
"Shape Cutting of Locomotive and Car Parts," by J. Grant, superintendent of motive power, Atlantic Coast Lines, Waycross, Ga.

"Economic Advantages of the Oxy-Acetylene Process to Railroads," by G. Durhan, vice president, Wheeling & Lake Erie Railroad, Cleveland.

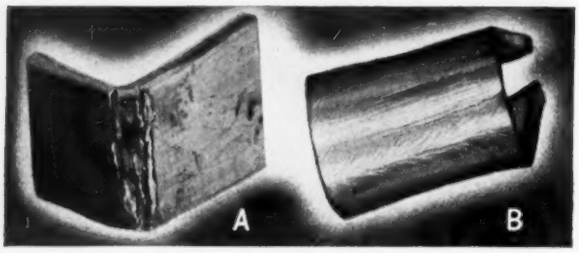
Discussion.

FERROCOLUMBIUM—

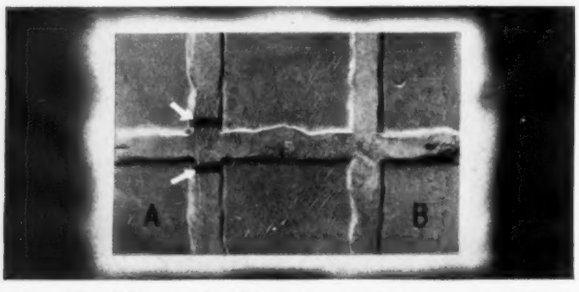
AN IMPORTANT ADVANCE IN THE WELDABILITY OF STAINLESS STEELS



Right—Fabricating a stainless steel refrigerator box with columbium-treated welding rod.



Bending tests on (A) welded normal 18-8 stainless steel and (B) welded columbium-bearing 18-8 stainless steel after boiling for 400 hr. in acidified copper sulphate. Note that the columbium-bearing specimen shows no cracking, indicating complete absence of intergranular corrosion.



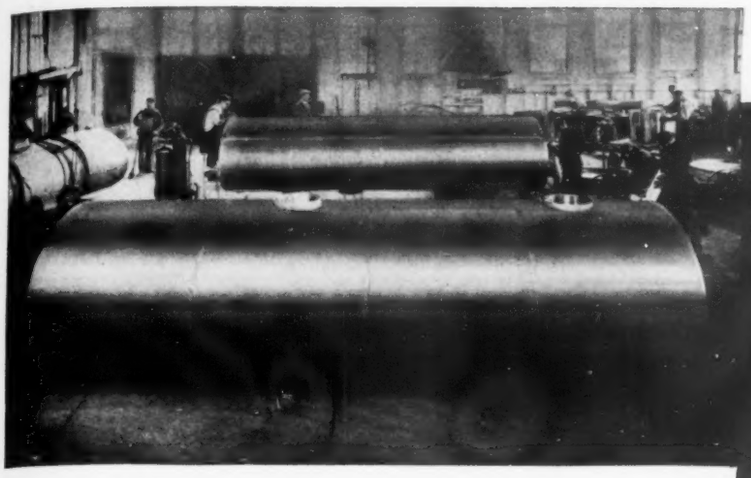
Crossed welds on columbium-bearing 18-8 stainless steels after testing in nitric hydrofluoric acid. The cross (A), made with untreated welding rod, shows intergranular corrosion indicated by the arrows. The cross (B), made with columbium-treated rod, indicates complete absence of intergranular corrosion.

COLUMBIUM improves the weldability of stainless steels.

Columbium-bearing stainless steels can be used after welding with columbium-treated welding rod without annealing. Subsequent costly heat treatment is eliminated. The welds are strong and fully as corrosion-resistant as the base metal. There is no increased susceptibility to intergranular corrosion in or adjacent to the weld seam. Columbium stabilizes stainless steels of the austenitic chromium-nickel type and minimizes susceptibility to intergranular corrosion. Columbium does not burn out to a detrimental degree during welding by any method.

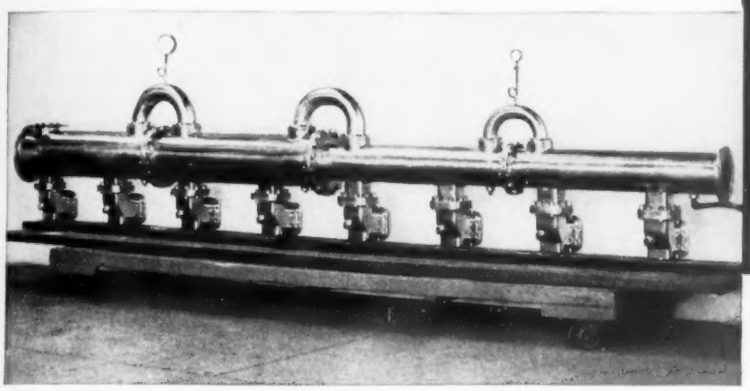
Widens Field for Stainless Steels

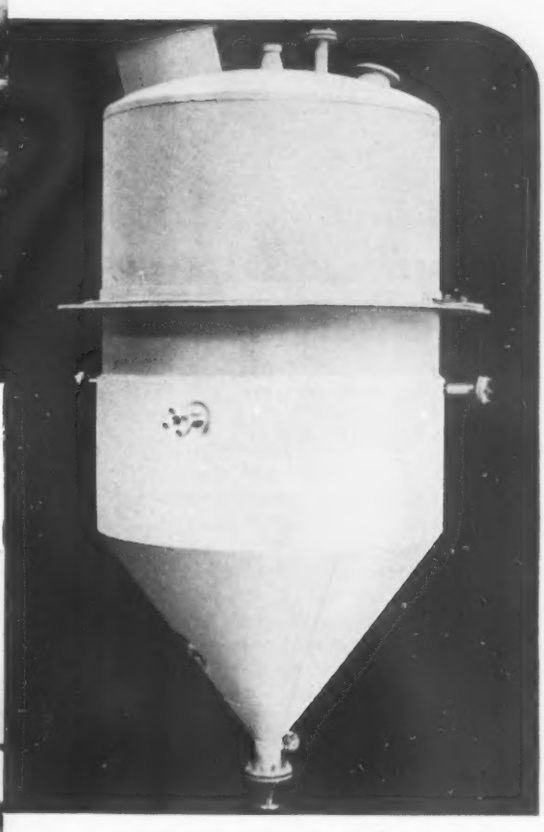
With improved weldability comes easier and cheaper fabrication. Columbium-bearing stainless steels and columbium-treated welding rod make possible the ready fabrication of stainless steel articles and equipment at costs low enough to assure salability. Thus new and wider use of stainless steels is made possible.



Above—Columbium makes stainless steel fabrication cheaper and easier.

Below—The annealing of stainless steel exhaust headers after welding is made unnecessary by the addition of columbium to the base metal and the welding rod.





Above—With columbium in the base metal and the welding rod, stainless steel yeast tanks can be made better and cheaper.

An Electromet Achievement

The development of columbium in stainless steels of the austenitic chromium-nickel type is an achievement of Electromet pioneering and research. The remarkable beneficial effects of columbium were discovered by Electromet Metallurgists in Electromet Laboratories. Electromet made columbium commercially available as ferrocolumbium. Thus Electromet's pioneering in the field of ferro-alloys and alloy steels renders a real service to all industry.

Electromet Service

Through twenty-nine years' experience, Electromet has developed a vast fund of practical and unbiased data on ferro-alloys and alloy irons and steels. A staff of trained metallurgical engineers is maintained to interpret these data and assist you in the manufacture and use of better alloy irons and steels.

Electromet laboratories are continually developing new alloys—new irons—new steels and new uses. Electromet's modern manufacturing methods assure alloys that are uniform in analysis, closely graded, correctly sized, and physically clean. Adequate warehouse stocks assure prompt deliveries.

These facilities, coordinated with the laboratory, manufacturing, sales, and service facilities of associated companies, constitute the Electromet Service that is yours for the asking.

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation

UCC

CARBIDE and CARBON BUILDING
30 EAST 42nd ST., NEW YORK, N.Y.

Electromet
Ferro-Alloys & Metals

PRODUCTS OF A UNIT OF UCC UNION CARBIDE AND CARBON CORPORATION

the same place. The first successful screw propeller steam vessel on the Great Lakes, appropriately named the EMIGRANT was built here and all the machinery and metal equipment used in its construction was fabricated in the foundry and machine shop of the Cuyahoga Steam Furnace Co.

The number of lake vessels engaged in the transportation of iron ore as of Oct. 15 was 155 while the total number of bulk cargo carriers in commission on this date was 186. Approximately 4,000,000 tons of iron ore was moved from the Lake Superior iron ore district during October so that the total for the season to Nov. 1, 1935 approximates 26,000,000 tons, compared with 22,000,000 tons in all 1934. A large portion of this tonnage was unloaded at Cleveland docks where it later passed either to inland furnaces or to stacks in Cleveland.

Iron ore is converted into pig iron in six modern blast furnaces in Cleveland and more than half of the

Morehead Medal for 1934 Is Awarded W. C. Bucknam

BY C. A. McCUNE

Past President, I.A.A., Chairman Morehead Medal Award Committee

THE Morehead medal for 1934 has been awarded to Worthy C. Bucknam for his outstanding accomplishments in the development of oxyacetylene welding and cutting apparatus, particularly motor-driven welding and cutting machines. The medal will be presented to Mr. Bucknam during the opening session of the 36th annual convention of the International Acetylene association, Hotel Cleveland, Cleveland, Tuesday morning, Nov. 12.

The Morehead medal was established in 1922 by the Hon. John Motley Morehead, former United States Minister to Sweden, in honor of his father, the late James Turner Morehead, who in 1892 sponsored the experiments which led to the discovery of the electric furnace method of producing calcium carbide. The medal is awarded annually by the International Acetylene association to the person or persons who in the judgment of its officers and board of directors have done most to advance the industry or the art of producing or utilizing calcium carbide or its derivatives.

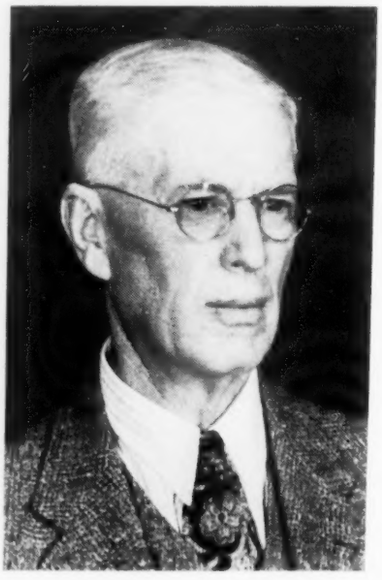
Worthy C. Bucknam was born in Mechanic Falls, Me., April 23, 1865. Broad experience in machine shop operations at Mechanic Falls and elsewhere gave him a practical grasp of fundamental mechanical principles that later enabled him to apply his inventive ability to the best advantage.

His first work in connection with acetylene was done around 1902 while in the employ of the manufacturer of the Stanley steam automobile. Steam was generated in a boiler fired by gasoline vaporized in a mechanism which required preheating before it would operate properly. Mr. Bucknam developed a pressure-type acetylene generator which solved the problem of providing a convenient means of preheating the vaporizer.

Later, with another company in Boston, his interest in the acetylene industry was carried a step further through the development of a line of oxyacetylene welding and cutting torches. It is of interest to record that during this early period, one of the transit companies in Boston made inquiries regarding the possibility of building-up rail ends by oxyacetylene welding, an operation that has only recently become extensively used. Mr. Bucknam devised a multiple-flame welding torch for this work, but due undoubtedly to the limited metallurgical knowledge available at that time, the application did not progress beyond the experimental stage.

Developed Cutting Machine

Mr. Bucknam's major contribution to the oxyacetylene industry dates from the period 1912-1913, during which he developed a series of motor-driven oxyacetylene welding and cutting machines. He was the first to develop a universal cutting machine, capable of cutting any desired shape, regular or irregular. Universal movement of the cutting torch was accomplished through an application of the pantograph principle. Movement of the torch was controlled by a motor-driven tracing wheel, guided by the operator along the line of a blue print or drawing of the shape to be cut.



Worthy C. Bucknam

In another type of machine, Mr. Bucknam employed a magnetized tracing roller guided by a steel templet as a means of controlling the torch movement.

Mr. Bucknam also developed the first practical portable cutting machine.

Subsequent inventions covered a wide range of cutting machines for special purposes, such as trimming flanged boiler heads, cutting rails, cutting holes in rail webs and structural shapes, splitting angles and structural shapes, and many others.

In developing a machine for welding the longitudinal seam of steel drums and containers, Mr. Bucknam first applied the principle of welding the seam from both sides simultaneously. Two torches were used, one above, the other below the seam. Later inventions in this field included machines for welding tubing, transformer cases, range boilers, and steel barrels.

Mr. Bucknam's activities also included many other phases of the oxyacetylene process. Of particular interest was his development of a line of welding and cutting blowpipes embodying the novel principle of a detachable valve body.

As indicated previously, however, Mr. Bucknam's chief contribution has been the development of motor-driven welding and cutting machines. Such machines assured greater uniformity and precision than was possible with hand-operated apparatus, and thus opened up a much broader field for the oxyacetylene process, especially in production work. Oxyacetylene cutting machines have revolutionized metal shaping operations and their constantly increasing use has effected untold economies throughout the metal-working industries.

For electric welding at its best

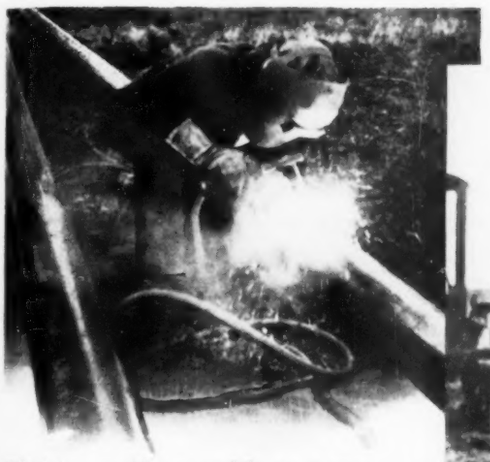
"The machines that make the arc behave"

The internationally famous

WILSON ARC WELDERS

Some of the Wilson Arc Welders that helped build the 1150 mile oil line in Irak, the longest welded pipe line in the world.

By their instantaneous reaction to, and automatic compensation for the thermal, chemical and physical changes which constantly tend to destroy arc stability, WILSON WELDERS make the arc behave. They are being used, in both this country and abroad with unvarying success. They assure sound, uniform, low-cost electric welding. Full details are in the WILSON WELDER Catalog. Write for a copy.



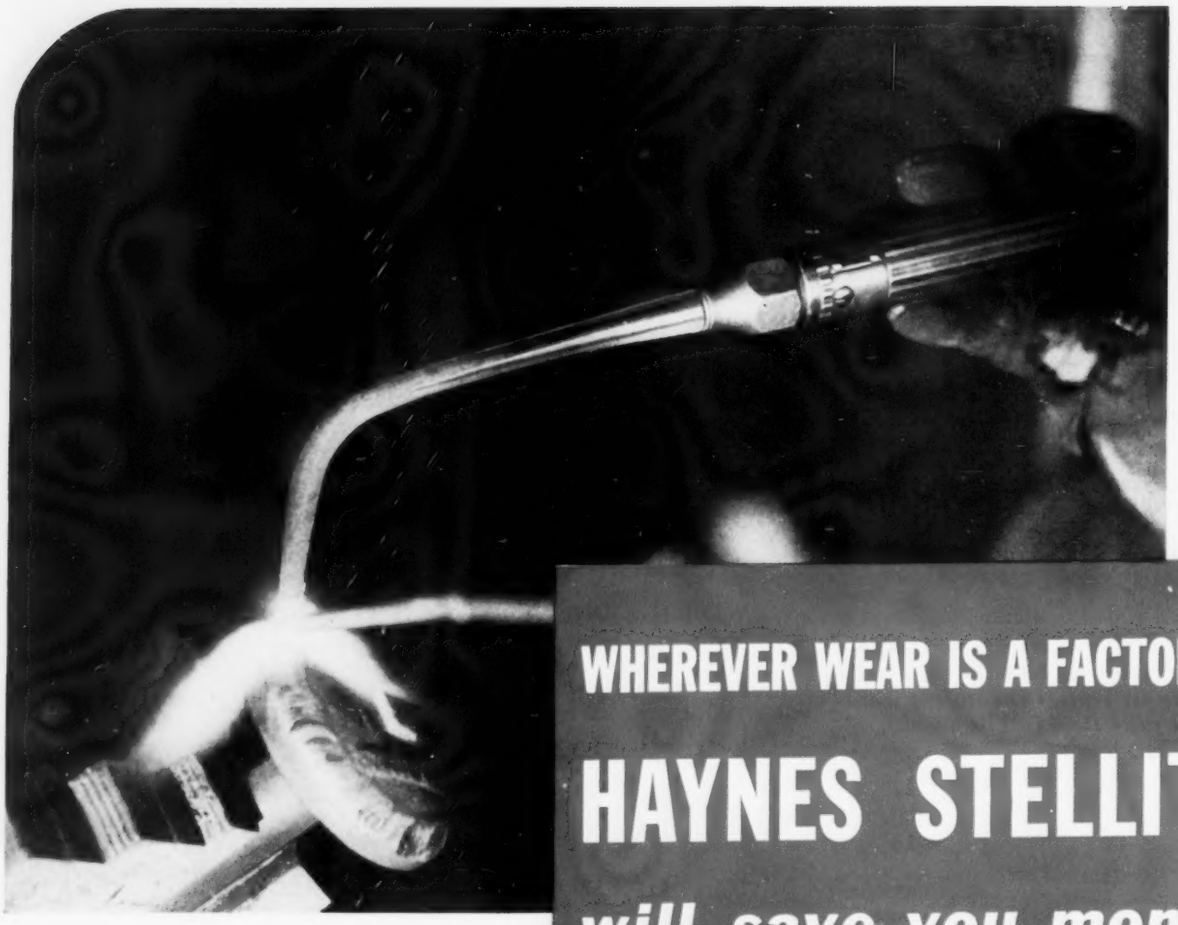
Making rolling welds on a gasoline line, at Enid, Okla. At right: The WILSON 300 amp. gas engine-driven trailer model.

WILSON WELDER & METALS CO., Inc.

Wilson Building, North Bergen, N. J.

Distributed through AIR REDUCTION SALES CO. Offices in Principal Cities

A NATION-WIDE ARC WELDING SUPPLY SERVICE



WHEREVER WEAR IS A FACTOR...

HAYNES STELLITE

will save you money

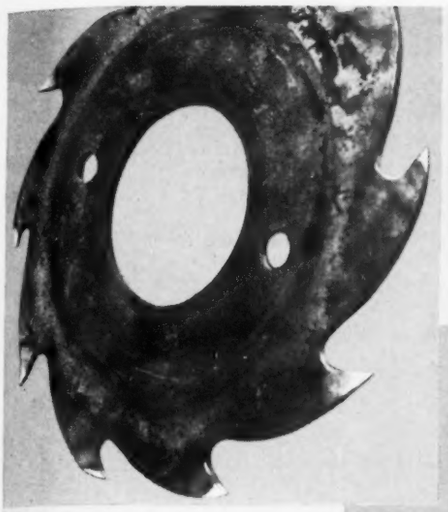
HAYNES STELLITE, known throughout the industrial world as the standard hard-facing, wear-resistant alloy, is a cobalt-chromium-tungsten alloy designed to combine excellent welding properties with maximum wear resistance. Haynes Stellite has a unique combination of physical properties:—red-hardness, abrasion-resistance, low coefficient of friction, and resistance to corrosion. In general, the life of Haynes Stellite is from 2 to 25 times that of ordinary materials. Haynes Stellite is available in the form of welding rod and is easily applied to metal surfaces by welding on a coating or edge.

Hard-Facing Saves Money

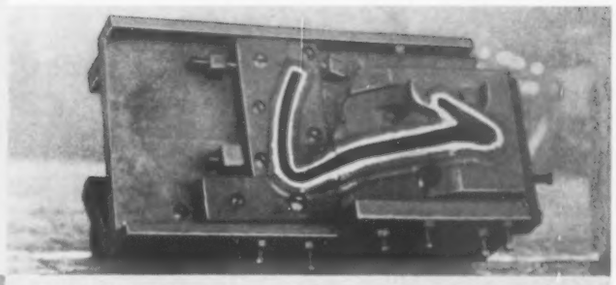
Hard-facing of metal parts with Haynes Stellite saves money in a great variety of ways. Of primary importance is the longer life of hard-faced parts. As a direct result of increased life, fewer replacements are necessary, thus avoiding costly shut downs while replacements are made. A further saving effected by Haynes Stellite lies in the fact that a cheaper base metal may be selected for its ability to withstand shock and fatigue without regard to its wear resistance. Worn parts which have already been scrapped can be salvaged, rebuilt and put back into service at a cost considerably less than that of replacement. A further indirect saving results from the fact that parts hard-faced with Haynes Stellite remain in better condition and always operate at their full efficiency. This has been found to effect important savings in power and production costs in a number of industries.

Let Haynes Stellite Company Help You

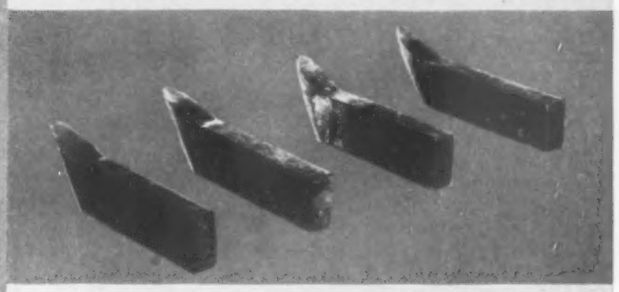
During the last few years industry has devoted increasing attention to the prevention of abrasive wear. Haynes Stellite Company is the pioneer and leader in the development of highly specialized alloys designed to meet the severe operating conditions of today. The Company has cooperated with industry in wear prevention work, and the elimination of wear through the use of Haynes Stellite is developing constantly. A nation-wide service organization is maintained to assist you in utilizing Haynes Stellite to best advantage. Haynes Stellite engineers bring to your plant experience thoroughly grounded in metallurgical research and a wealth of information on hard-facing applications gathered from all parts of the United States.



SHREDDER KNIVES *in a pulp and paper mill with Haynes Stellited teeth lasted five times as long as they did before. The saving was $2,200 annually.*

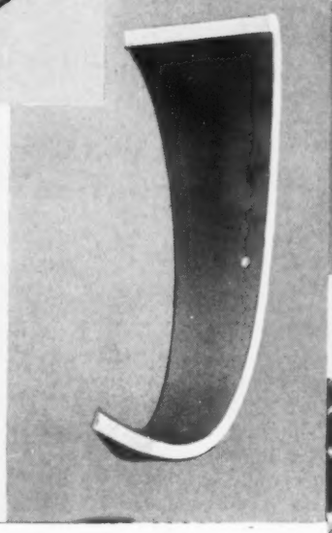


THIS HOT TRIMMING DIE, *when Haynes Stellited by a Michigan forge company, gave 14 times more pieces than a steel die. The manufacturer estimates the savings at $40 a day.*



UNDERCUTTER BITS. *Haynes Stellite applied to the tips of undercutter bits effected 50 per cent savings in bit costs. Haynes Stellited bits also cut 3 to 6 times more coal per grind than ordinary bits.*

A FEED CAM *on an automatic screw machine in the plant of an automobile manufacturer was Haynes Stellited for its entire length to a depth of 1/8 in., tapering to 1/16 in. on the smaller end. The cost was one-quarter that of a new cam, and its life was extended 3 times. This is typical of the many valuable applications of Haynes Stellite Products made by automobile producers and other manufacturing industries.*



VALVE DISKS *for high-pressure, high temperature steam service. Haynes Stellite outlasts usual seating materials six to ten times because of its resistance to abrasion, corrosion and erosion.*

AUTOMOTIVE VALVES AND VALVE SEATS. *A prominent bus line recently installed Haynes Stellited valves in one of its motors, already equipped with standard Haynes Stellited exhaust valve seat inserts. These valves and valve seats have run for more than 60,000 miles without any attention whatsoever and are still going. This company has ordered 150 more Haynes Stellited Valves.*

Send for Hard-Facing Book

Only a few typical applications of Haynes Stellite are illustrated here. Write for a copy of the 96-page book "Hard-Facing with Haynes Stellite Products", which describes in detail 494 ways of saving money by hard-facing. This booklet may be obtained without obligation from Haynes Stellite Sales Offices located in Chicago, Cleveland, Detroit, Houston, Los Angeles, New York, San Francisco and Tulsa, or from the General Office and Works at Kokomo Indiana, or Foreign Sales Department, New York, N. Y. Haynes Stellite welding rods and information on other Haynes Stellite Products also are available through the 42 apparatus shipping points of The Linde Air Products Company.

PRODUCTS OF A UNIT OF UCC UNION CARBIDE AND CARBON CORPORATION

HAYNES STELLITE

A red-hard, wear-resisting alloy of Cobalt, Chromium and Tungsten

HAYNES STELLITE COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

Chicago · Cleveland · Detroit · Houston · Los Angeles · New York · San Francisco · Tulsa

General Office and Works—Kokomo, Indiana

Foreign Sales Department—New York City

Haynes Stellite Welding Rods and information on other Haynes Stellite Products also are available through the 42 apparatus shipping points of The Linde Air Products Company

Cast of Characters and Scenes of "Profits of Progress"

Margaret Flint (Wife of Sales Manager, Robinson Engine Works) ..... Miss Harriet Hall
Janet Claire (Secretary to President) ..... Miss Betty Renner
James Flint (General Sales Manager) ..... J. M. Hickey
Robert Douglas (Asst. Design Engineer) ..... J. W. McKernon
J. Malcolm Robinson (President) ..... T. M. Hamer
Walter Lord (Wealthy Automobile Manufacturer) ..... E. C. Turner
Harry Page (Asst. Design Engineer—Robinson Engine Works) ..... J. C. Carter
George Tobin (Chief Engineer) ..... G. V. Slottman
Alfred Parker (Plant Supt.) ..... E. J. W. Egger
Newell Hoyt (District Manager—Buckeye Welding Equipment Co.) ..... C. E. Westin
John Baird (Service Engineer—Buckeye Welding Equipment Co.) ..... W. S. Walker
William Dean (A Welder) ..... H. O. Jones
Joseph Kaiser (A Welder) ..... A. W. Davis
Jerry Davidson (A Welder) ..... John Watson
Jack Hubbard (A Welder) ..... J. W. Thompson
Pete Smith (A Welder) ..... M. W. Hippe
An Office Boy ..... L. R. Cross

ACT ONE

Scene I—Living Room of the Flint Apartment.
An Evening in May
Scene II—Office of the President, Robinson Engine Works.
The next morning.

ACT TWO

Scene I—Office of the President.
Following afternoon.
Scene II—Office of the Plant Superintendent.
Two days later.

ACT THREE

Scene I—A section of the shop, Robinson Engine Works.
Two weeks later.
Scene II—Interior of the Music Hall, Cleveland, during the showing of a current news-reel.
Three days later.

ACT FOUR

Living Room of the Flint Apartment.
Four months later.

pig iron afterward is employed in the production of steel for rolling or for gray iron and malleable castings for steel ships, wire and wire products, bolts and nuts, heavy machinery, automobile parts, machine tools, vehicle hardware and practically every form in which steel or iron is employed.

Hoisting and conveying machinery made in Cleveland may be seen in every industrial country of the world where ore is mined or where it is reduced to its metallic form. Whistling jets of steam from Brown-Hoist cranes punctuate the day's work in Alaska; high up in the Cordilleras of South America and in the African Rand. The calloused hands of a native Chinese laborer are as familiar with the electric controlling levers on a Brown bridge serving a blast furnace in Hankow, China, as are those of his white brother handling a similar device in Sidney, Nova Scotia, or in the home town of its maker designated on the nameplate as Cleveland, Ohio, U. S. A.

Charging machines, water-cooled reversing valves, gas producers, and other devices responsible in great measure for the advance in open-hearth steel melting practice in recent years are made by the Wellman Engineering Co. The manner of handling bulk freight, particularly iron ore and coal on the lakes was revolutionized by the late S. T. Wellman when he developed a machine that picks up gondolas loaded with coal and dumps the contents into a waiting freighter at the rate of one a minute. Material is unloaded from these boats almost as rapidly by two types of unloading devices, one credited to S. T. Wellman and the other to S. H. Hulett. Four of these latter machines working in unison on the docks at Conneaut, O., established a world's record on Sept. 12, 1921, when they whipped 12,507 tons of iron ore out of the steamer D. G. Kerr in three hours and five minutes.

Industrial Drama Is Spectacular

PROFITS of Progress, a four-act industrial drama, will be presented for the members and guests of the International Acetylene association Nov. 12 at their annual meeting in Cleveland. A modified version of this play was presented at the meeting last year and met with such widespread acclaim that a performance at the 1935 meeting was requested.

Written especially for the International Acetylene association, Profits of Progress is a pleasing combination of fun, romance and actual business information. The play concerns the difficulties encountered by the Robinson Engine Works and Mr. Robinson, its president, in holding the lucrative account of the Lord Co., automobile manufacturer. Business has grown steadily worse for the Robinson Engine Works, because, as James Flint, their sales manager, claims, they haven't progressed. Their motors no longer will meet the competition in quality or prices.

Sells New Idea

The Lord Co., their last and largest account, threatens to withdraw its business unless a miracle of modern motors is produced over night. Mr. Robinson, in desperation, seizes upon a radical design put forward by his assistant design engineeer for an all-welded alloy steel diesel engine and sells the idea to Mr. Lord. "All right," says Mr. Lord, "show me the motor and if it is as good as you say, we'll buy thousands of them."

Only with the aid of oxyacetylene welding and with the co-operation of welding experts is Mr. Robinson able to accomplish the miracles that lead to the final completion of the motor. It's a glorious success and orders pour in by the tens of thousands. The account is saved and the Robinson Engine Works is rescued from a financial grave.

Entertaining to a high degree, Profits of Progress also offers interesting information on the use of the oxyacetylene process in modern industry. Cleverly interspersed throughout the scenes are glimpses of the latest developments in oxyacetylene welding and cutting.

The four-act drama is an interesting and exciting enactment of a problem involving many industrial executives and workers today. The motion pictures shown in Act I are authentic views of actual applications of the oxyacetylene process.

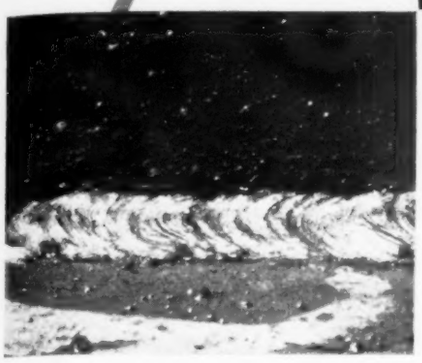
The industrial drama was written by Wilfred P. Burglund. The cast of characters in the order of appearance is shown at top of this page.

Forum Is Divided Into Four Parts

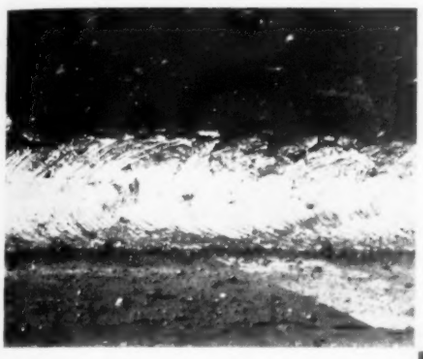
EVER since Nov. 16, 1932, when, for the first time a full three-act play was used as a vehicle for portraying to a convention audience the importance of an industrial process, the members of the association have been conscious of a latent demand for some method of bringing those interested in the use of the oxyacetylene process into contact with men capable of discussing the users' problems in language that they could understand, and at a convenient time.

To meet this demand, the International Acetylene association now introduces the Forum. This innovation in technical society sessions will be held Wednesday, Nov. 13, at 8:15 p. m. in the Brotherhood of Locomotive Engineers' auditorium, 1370 Ontario street. It is to be devoted to the presentation of answers to common questions which concern the

Two SATISFACTORY WELDS ..but the weld made on the manipulator cost 1/5 as much as the other . . .

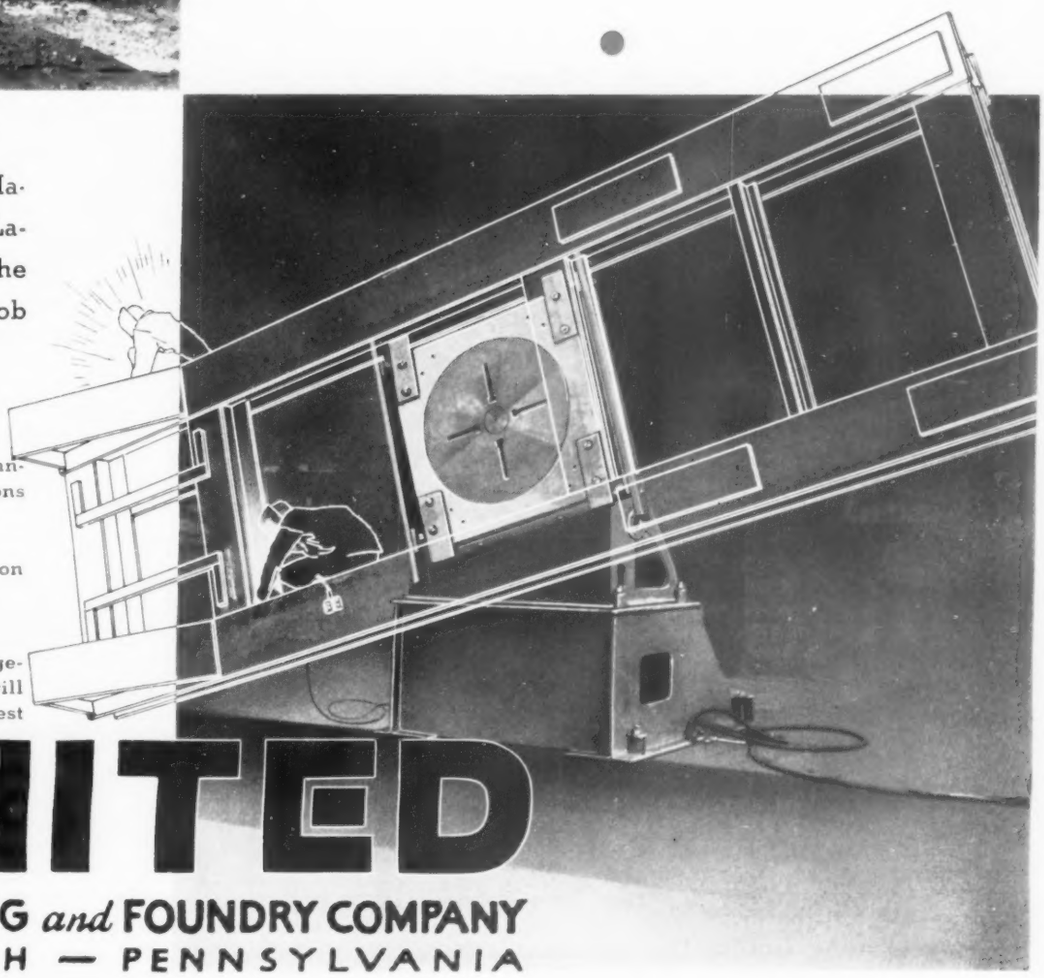


This fillet weld was made with $^{5}/_{32}$" dia. shielded arc welding rod with 150 amperes at rate of *1.40* lbs. per hour.



The same job welded on the Manipulator with $^{5}/_{16}$" dia. shielded arc welding rod with 350 amperes at rate of *7.04* lbs. per hour.

Welding on the Manipulator Saves Labor and improves the appearance of the job



Manipulators built to handle any job up to 100 tons

Write for an Estimate on Your Job

United bulletin "Management of Welding Costs" will be gladly sent on request

UNITED

ENGINEERING *and* FOUNDRY COMPANY

PITTSBURGH — PENNSYLVANIA

users of the oxyacetylene process. But these questions are not going to be answered in any common, orthodox fashion. If, reasoned the association, it is possible to show the tremendous importance of oxyacetylene welding and cutting in modern manufacturing processes by means of a drama, it should be possible to dramatize the answers to:

What is considered Public Enemy No. 1 of the welding industry?

What is acetylene and why is it the most effective fuel gas for welding and cutting?

What faculty does iron possess that no other metal has?

How can rivets be cut at speeds of 700 per hour without scoring plate?

Why, when cutting heavy steel shapes by the oxyacetylene process, is but a negligible amount of power required?

For a majority of the questions the Forum will provide a unique answer. One of the outstanding advantages of the oxyacetylene process is that it can easily be taken to the job. Even some of the oxyacetylene shape cutting machines may be transported readily to the material to be cut. This portability of equipment has made possible a Forum program that will not only include speakers of nationally recognized authority but will illustrate in a practically uninterrupted sequence of demonstrations by skilled operators the answers the speakers give.

For instance, the so-called oxygen lance is the simplest form of cutting, requiring only oxygen and a piece of ¼ or ⅜-inch iron pipe, yet the principle involved, the procedure to be followed, and the safety precautions to be observed are not generally understood. Each of the questions about the oxygen lance will be answered by the speaker and illustrated with actual demonstrations by a skilled operator.

This same plan will be applied to questions that have been submitted on welding. These indicate a lively interest in identifying the metal to be welded in welding alloy steels, in brazing, and as these and many other questions are answered, the answer will be visualized by skilled operators on the stage.

Charts and motion pictures will supplement the efforts of the speakers in answering some of the questions, for not all of them can be answered by actual demonstration.

Four Important Topics

From an analysis of the questions it became apparent that the Forum could be divided into four main sections, one devoted to the problems of oxyacetylene cutting, one to welding, another to the many questions concerning the testing of welds, and the fourth to the inquiries on safety. Then began the search to locate the men qualified by research and experience to conduct these sections.

J. J. Crowe, chief of research and development department of Air Reduction, president of American Welding society, will preside over the section devoted to cutting.

Dr. A. B. Kinzel, chief metallurgist, Union Carbide and Carbon Research Laboratories, will preside over the section devoted to welding.

J. I. Banash, past president, National Safety council, and a consulting engineer, will preside over the section on safety. A perusal of the questions on safety indicates that not only will Mr. Banash discuss safety in the setting-up and operation of oxyacetylene apparatus but that he will also discuss safety in the finished welded product.

Both Mr. Crowe and Dr. Kinzel will conduct the section devoted to the uses and applications of tests.

The frequency with which questions on tests, both for qualifying welders and to determine the qualities of a weld were asked, indicates that this will be one of the most interesting portions of the Forum. Practically all of these tests will be demonstrated.

So, once again, one of the oldest technical associations initiates a new method of increasing its effectiveness in a broad way and upon a solid technical foundation.

MAURATH

Arc Welding

ELECTRODES

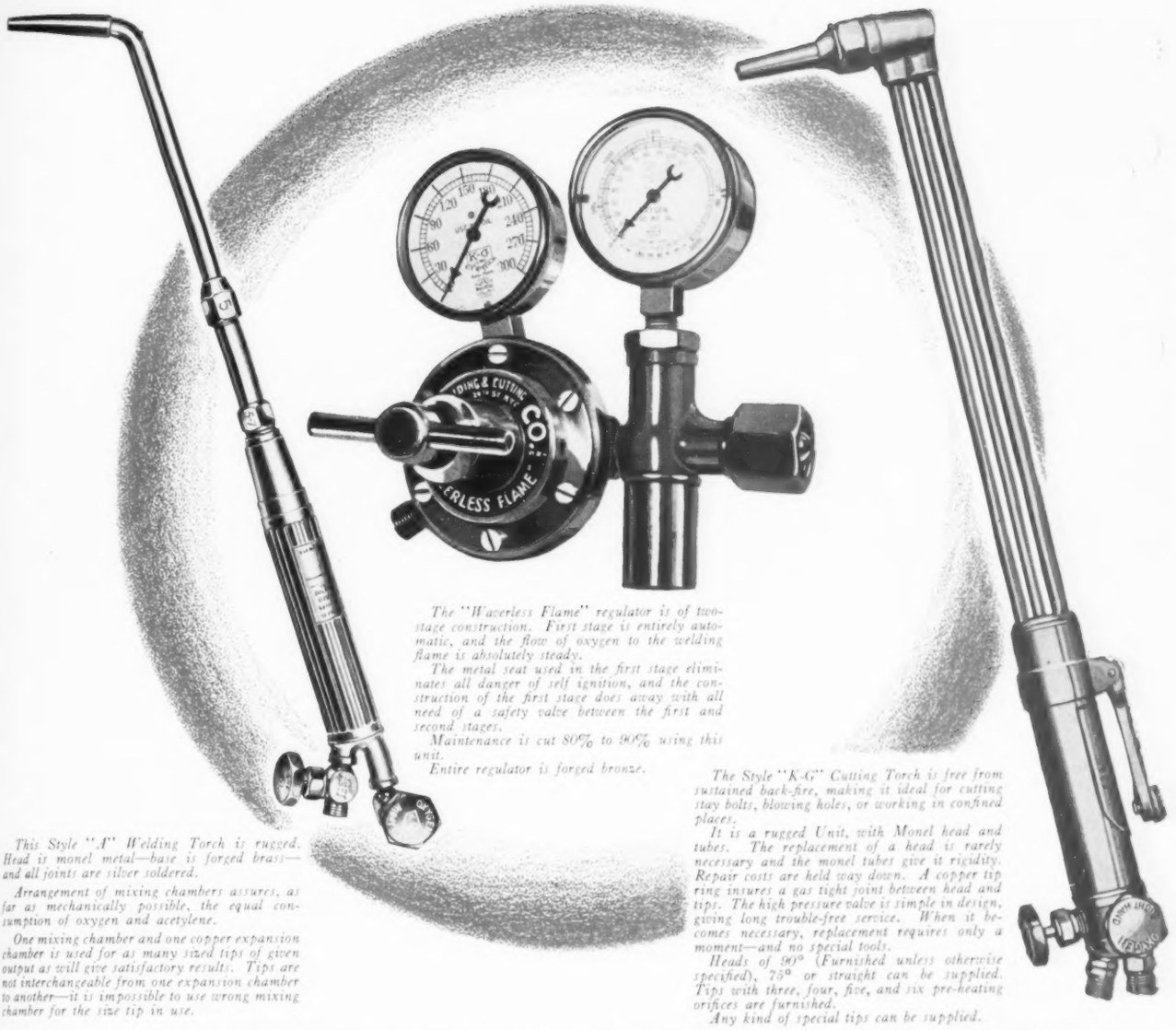
Maurath Processed Electrodes stand the most drastic test and service and produce an exact analysis without loss of elements or adding injurious inclusions.

If you weld stainless alloys buy from the oldest company producing Alloy Electrodes exclusively and serving the world's leading steel producers and users.

MAURATH'S Alloy Data Book and Price List, containing a wealth of useful information, is yours without obligation.

MAURATH, INC.

7300 UNION AVE. - - CLEVELAND, OHIO



The "Waverless Flame" regulator is of two-stage construction. First stage is entirely automatic, and the flow of oxygen to the welding flame is absolutely steady.

The metal seat used in the first stage eliminates all danger of self ignition, and the construction of the first stage does away with all need of a safety valve between the first and second stages.

Maintenance is cut 80% to 90% using this unit.

Entire regulator is forged bronze.

This Style "A" Welding Torch is rugged. Head is monel metal—base is forged brass—and all joints are silver soldered.

Arrangement of mixing chambers assures, as far as mechanically possible, the equal consumption of oxygen and acetylene.

One mixing chamber and one copper expansion chamber is used for as many sized tips of given output as will give satisfactory results. Tips are not interchangeable from one expansion chamber to another—it is impossible to use wrong mixing chamber for the size tip in use.

The Style "K-G" Cutting Torch is free from sustained back-fire, making it ideal for cutting stay bolts, blowing holes, or working in confined places.

It is a rugged Unit, with Monel head and tubes. The replacement of a head is rarely necessary and the monel tubes give it rigidity. Repair costs are held way down. A copper tip ring insures a gas tight joint between head and tips. The high pressure valve is simple in design, giving long trouble-free service. When it becomes necessary, replacement requires only a moment—and no special tools.

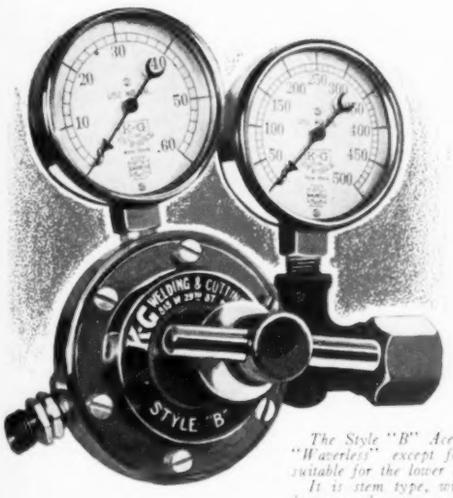
Heads of 90° (Furnished unless otherwise specified), 75° or straight can be supplied. Tips with three, four, five, and six pre-heating orifices are furnished.

Any kind of special tips can be supplied.

"K-G" welding and cutting equipment is designed for the most efficient and economical operation possible - in any situation - under any conditions. The "K-G" line is fully complete, and the most difficult welding and cutting problems can be readily solved through the proper selection of "K-G" units.

Equipment manufactured by "K-G" is passed upon by both the Underwriters Laboratories and Factory Mutuals. Each unit is guaranteed against all material and manufacturing defects. Any defective unit will be replaced without cost. "K-G" considers that a purchaser presents a new obligation to prove that "K-G" equipment will give him the highest possible service. They therefore guarantee their equipment to give complete satisfaction, and will gladly refund the purchase price of any equipment that fails to meet requirements.

Write for Catalog No. 34. It tells a detailed story about "K-G's" complete line.



The Style "B" Acetylene, is the same construction as the "Waverless" except for lighter springs, which are more suitable for the lower pressure.

It is stem type, with self adjusting swivel attachment between valve stem and diaphragm. Monel metal is used in all valve stems and diaphragms are made from reinforced, specially vulcanized rubber.

K-G WELDING & CUTTING CO., INC.
515-519 West 29th Street, New York, N. Y.

Oxyacetylene Process Cuts Cost of Making Steel

BY W. D. WILKINSON
Engineering Director, Linde Air Products Co., New York

OXYGEN lance and the oxyacetylene welding and cutting blowpipes first were used in open-hearth operations shortly after the beginning of the twentieth century. Although the first oxyacetylene blowpipe of a practical type appears to have been made by the Frenchmen, Fouche and Picard, in 1901 and the oxygen lance was evolved contemporaneously, the experimental basis for the development of the oxyacetylene cutting process goes back at least to the year 1776. It was in this year that Lavoisier is credited with having made the discovery that iron would burn in oxygen — the principle upon which oxygen cutting of iron and steel depends. According to a German source, however, Lavoisier first had learned of this phenomenon from Ingen-Housz, who had done the experiment eight years previously in Vienna.

Flame Temperature Is High

In 1895, LeChatelier, another French chemist, discovered that the combustion of acetylene with an equal volume of oxygen produced a flame having a temperature far higher than that of any gas flame previously known. By an interesting coincidence, it was the same year that Dr. Carl von Linde had placed in operation a machine for the production of liquid air. This machine was the forerunner of the present process for the manufacture of commercial oxygen; and, indeed, seven years later Linde was producing oxygen on a commercial scale.

Acetylene, the other important welding gas, experienced contemporaneous development. Morehead and Willson during May, 1892 had demonstrated the feasibility of producing calcium carbide in an electric furnace. Calcium carbide is the material from which acetylene now is made. The stage then was set for the discovery of the oxyacetylene blowpipe by Fouche and Picard.

Although the oxyhydrogen blowpipe had been suggested by an American, Robert Hare, in 1805, it was not made until 1820, by Broke in Germany, and even then it remained merely an interesting laboratory apparatus until 1901 — the year that the oxyacetylene blowpipe was invented.

The first blowpipes were used solely for welding. Although the cutting blowpipe was patented in France in 1904 the patent was revoked, and the question of whether the cutting blowpipe was a distinct tool worthy of being patented, was moot in the French courts from 1909 until 1913. In Germany, however, such patents were recognized as valid. The first applications of a patented cutting blowpipe to furnace tapping were made in the Pittsburgh district in 1908 by the German inventor, E. Menne.

Tapping Difficulties Encountered

At the same time that LeChatelier was experimenting with acetylene and Linde with liquid air, David Baker was calling to the attention of the American Institute of Mining Engineers the fact that, while great improvements had been made in almost every detail of blast furnace operations, it was becoming increasingly difficult to tap molten iron.

The material that fills the hole bakes hard and often becomes cemented with metals or slag. Although Baker had instituted a pneumatic rock drill arrangement for tapping blast furnaces, this method was rather unsatisfactory because of the difficulty of operation — five or six men were required — and the number of bits that were ruined. The same difficulties beset open-hearth operations.

The first person in America to use oxygen for furnace tapping was probably Randolph Bolling. In July, 1902, he had tried vainly to tap a blast furnace with a sledge and bar for hours with a hydrocarbon blowpipe. Using two low-pressure tanks of oxygen that he had in the laboratory, he discharged this gas through a porcelain tube on the red hot iron in the notch. Fortunately, he was able to burn his way deeply enough so that a chisel bar could complete the work. A closer approach to the oxygen lance operation was made in 1903 by E. T. Ross. Although the flowing of oxygen against heated metal had been used as early as 1901 for demolition work, Ross was the first on record to use a stream of oxygen blown through a ¼-inch iron pipe against a frozen cinder notch. The oxygen opened the notch in a few moments, whereas, previously, he had tried using a coal oil burner, working with it 24 hours with little effect. Burning the end of the pipe and the bits of coke and metal in the frozen furnace filling generated enough heat to melt through the slag. This is practically the same scheme as that now used.

Results in Burner Trouble

Although in 1908 the German, E. Menne, was able to tap a furnace in a few minutes with his patented equipment, the process was hardly a success. His burner, which was similar to the present cutting blowpipe, was protected against heat by a refractory covering, but it was nevertheless unable to withstand the intense heat generated in the bottom of the deep hole. It would burn away, leaving nothing but a pair of concentric pipes, and it therefore was evident that oxygen alone was do-

Ladle skulls of large size size can be cut to charging box size by the oxygen lance. Before the oxyacetylene process was available, blasting would have been the only means of scrapping frozen alloy steel skulls

The composition of YOLOY is such that its unique properties (see panel at right) persist after welding. The alloy "stays put" in the weld and does not air-harden, making machining across the weld perfectly practical.

As compared with ordinary carbon steels, YOLOY possesses four to six times the corrosion-resistance, withstands abrasion better, and at the same time gives you increased tensile strength. At a lower ultimate cost than for carbon steels, YOLOY permits lighter construction with equal strength or greater strength and longer life with the same weight.

Write for YOLOY Bulletin.

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon and Alloy Steels
General Offices - YOUNGSTOWN, OHIO

YOLOY

is furnished in sheets, strip, plates, bars, shapes, manufacturer's wire, welding pipe, seamless and electric weld pipe.

570

ing all the work. Ross already had shown that extremely high oxygen pressures are unnecessary, but Menne apparently did not know that.

As a result of all these experiments the oxygen lance was evolved and was adopted quickly for emergency tapping by most manufacturers. This was so simple, quick and unfailing, the cheapest kind of insurance against expensive delays, that it is now used as the standard routine method.

Complete oxygen lance equipment consists of a manifold of oxygen cylinders with a regulator, standard oxygen hose connections, perhaps 30 feet of ⅜-inch oxygen hose, a reducing couple, a 1-inch pipe which is used for a handle, and a reducer for attaching it to the ¼ inch pipe that is the lance proper. The ends of the lance pipe should be threaded, so that when partly burned away the pipe can be attached easily to a new length. Nevertheless, except when the oxygen lance is melting through clay or other refractory material, any burning of the pipe or the lance represents a certain amount of waste. It is not that the lance pipe is expensive, but the time consumed in replacing it might be better employed. Furthermore, in the drilling of iron or steel there is scarcely any reason for burning the lance pipe, because it can be protected easily by a hardwood tip. This is not, however, standard practice at present. If fuel is needed to melt through nonferrous material, a white-hot bar or bolt end is often used.

The protecting tip that appeared to give the best results was 1½ inch diameter and 12 to 18 inches long and extended over the lance pipe a distance of 4 to 6 inches. Contrary to expectations, the tip does not burn rapidly, but chars down to a tapered point. In general it will last for several tappings. The charred section seems to protect the tip from further rapid combustion.

After the steel has been tapped into a ladle, if the stopper of the ladle should become frozen, the lance quickly will open it. Before the tap hole of the furnace is plugged up with clay for a new heat, the oxygen lance is used to clean the tap hole.

Used for Tapping Pit Slag

The notch hole for draining slag from the soaking pit is also opened with the lance. Ordinarily the entire lance would tend to get red hot and burn up; but if a wooden tip is used it will permit the lance to be used hours sooner than otherwise would be possible.

Ladle skulls too thick to be broken with a "skull cracker" are cut easily with the lance operating in conjunction with an oxyacetylene cutting blowpipe.

As early as 1901 oxygen had been applied for demolition but not, properly speaking, for cutting. The operator heated the metal nearly to the fusion point, and then directed oxygen against the middle of the heated zone. The "cut" was wide, rough, pitted and irregular. The two processes of heating and oxidation were separate and distinct. In 1904, Jottrand and Lulli studied a method of doing these operations simultaneously, and they had excellent results. Their method, together with the apparatus for carrying it out, is described in a patent taken out in 1904 by the Societe L'Oxyhydrique Francaise.

The cutting blowpipe has many uses in open-hearth practice. Besides being used to assist the oxygen lance in scrapping skulls, the oxyacetylene cutting blowpipe is used to cut up spills and in conjunction with the welding blowpipe, to fabricate hot-top water coolers and other equipment. Doors and door frames are of course very necessary. Many constructors also build water-cooled boxes into the brickwork at various parts of the furnace, and about the gas and air ports, in order to prevent excessive scour and to maintain the brickwork in proper lines. Many manufacturers of this equipment find that oxwelded steel plate is far more satisfactory for this construction than iron or steel castings. The oxyacetylene blowpipe also makes a joint which is uniquely successful in its ability to withstand the excessive temperature strains to which the piece is subjected.

The cutting blowpipe has been used so frequently in scrapping spills that any number of interesting examples of this application could be given. The *Acetylene Journal* of June, 1923, tells about an open hearth furnace that broke while in operation, spilling a full charge of 80 tons of molten high carbon steel on the floor between two of the furnaces.

Although a pocket had been provided to catch the escaping metal in such an emergency, the walls gave way under the excessive weight of metal and slag. Carrying with it part of the furnace wall, the molten metal solidified into a great slab of steel, slag and brick. The management, however, made no effort to remove the spill because blasting would endanger adjacent furnaces and machinery. The furnace was rebuilt and put back in operation, but the mass of metal remained there for 18 months. Finally an oxyacetylene engineer drew the attention of the management to the possibility of cutting the steel into pieces small enough to be handled.

How Metal Was Removed

First the slag was chipped off along the line of cut with a pneumatic tool, and then the blowpipe was used. The lance was called upon where thick layers of brick were encountered. At first the cutting was difficult because the mass of metal was tight against the floor and the slag had to be blown upward. After a few sections had been cut into handling sizes and lifted from the floor with jacks, the rest of the cutting was made easier because a better outlet for the slag was provided. It took one man about 10 days to do this work, for he had to cut ap-

The NEW WELDIT MODEL A Automatic
WELDING TORCH
with GASAVER in Handle

SAVES FUEL...
...CUTS COST

Thumb controlled Gasaver in handle cuts welding flame to pilot light size instantly when torch is not in actual use. Savings not affected by hose length. No re-lighting, no re-adjusting. Safe and simple to operate.

Send for literature.

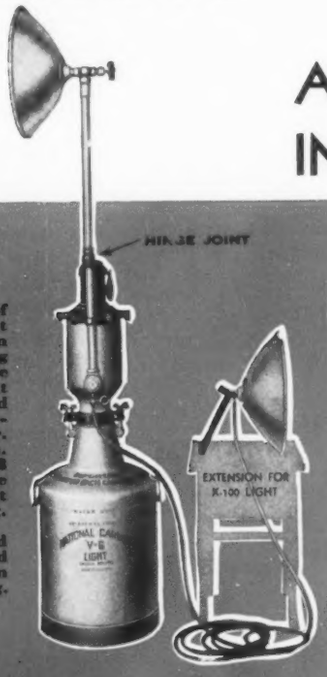
WELDIT ACETYLENE CO. 634 BAGLEY AVE. DETROIT, MICH.

TEST THIS •WELDING TORCH FREE FOR TWO WEEKS IN YOUR PLANT

Portable DAYLIGHT

AN ABSOLUTE ESSENTIAL IN CONSTRUCTION WORK

National Carbide Lights give you the nearest approach to actual sunlight known. These dependable and convenient lights are safe and economical to operate. Get "daylight Conditions" on your night jobs and increase the speed and efficiency of your workers with National Carbide lights.



THE NATIONAL CARBIDE V-G LIGHT, No. X-100

Spreads a full, even beam of about 3000 candlepower right where you need it. Simple in construction without anything to get out of order, it gives ample clear, steady light for about twelve hours on one 7-pound charge of National 14-ND Carbide and 7 gallons of water. Easily handled by one man. Weight 35 pounds empty, 98 pounds when full. No harm done if it tips over;—simply stand it up, and it goes right on working.

Reflector standpipe may be tilted to any angle. Also standpipe and reflector may be folded down along side of hopper for shipping.

THE NATIONAL CARBIDE LANTERN

Is the nearest approach to daylight ever found in a lantern—giving ten times more light than an oil lantern, and at less cost. It is sturdily constructed, with convenient handle and extra bail for carrying on the arm. Easily filled. Easily lighted. Burns eight hours on a single 8-ounce charge of Carbide and one filling of the water chamber. A brilliant rear signal of red, blue or green is supplied without extra charge if required.

THE NATIONAL CARBIDE V-G HANDY-LIGHT No. Y-199

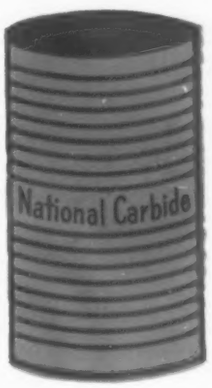
Is a smaller size consisting of a tank holding 2 gallons of water, a hopper containing a 1¼-pound charge of National 14-ND Carbide and the feeding device. It runs for approximately five and one-half hours on one 1¼-pound charge of carbide and one 2-gallon charge of water delivers about 1500 candlepower. It is a most handy light to use for emergencies as it is so easily carried around. Weight only 37 pounds when charged. Reflector may be tilted to any angle.

Specify NATIONAL CARBIDE in the RED DRUM

for

HOUSE LIGHTING
WELDING and CUTTING
ALL TYPES of CARBIDE LAMPS

The superior quality of NATIONAL CARBIDE has been proven and is preferred by users in the mine fields and industrial areas. Its unvarying high quality means considerable more light hours per pound and more even and better operation of carbide lights. NATIONAL CARBIDE is available everywhere, always packed in the Red Drum. Distributors and Warehouses are located in all principal cities.



NATIONAL CARBIDE SALES CORPORATION

LINCOLN BLDG. · NEW YORK CITY

proximately 150 linear feet of metal averaging 14 inches thick.

The salvaging of this 80 tons of steel more than warranted the cost of the job. This steel was needed so urgently that 50 tons of it had been remelted before the oxacetylene engineer left the mill.

Although the welding blowpipe had found some use in open-hearth practice within a few years after its first industrial application in 1903, the advent of the World war stimulated inventive genius and greatly widened the scope of its applications. Oxwelding is used in the maintenance of the railroad tracks used in the transportation of pig iron and slag; in the repair of broken water coolers, hydraulic rams and other equipment; in restoring cracked slag ladles to service; and in hundreds of other ways.

One huge slag ladle that was cracked required only 20 hours labor for the repair. The cost of labor, welding gases and welding rod was obviously a small fraction of what the replacement cost of the slag ladle would have been.

Besides being used in repair work, the oxyacetylene welding blowpipe is used in the construction of apparatus. Hot tops can be made with the blowpipe out of boiler plate in 30 minutes. Pipe as well as steel plate is used in making water-cooled equipment. One simple job that before the War would have been a problem was the fabrication of a steam jacketed tar line and a rather complicated tar burner. This apparatus was made entirely of oxwelded plate and pipe.

The plant where this equipment was used had changed from natural gas fuel to by-product coke oven gas. It then was found necessary to inject tar into the fuel to produce a luminous flame. If the equipment could not have been fabricated by welding, the entire enterprise would have been a failure.

Plants that use producer gas have other opportunities to avail themselves of the oxyacetylene process. Many broken parts are constantly being repaired by oxyacetylene welding. In addition to the repair of fractured equipment, worn or corroded parts can be built up with manganese steel welding rod or, better yet, with Haynes Stellite. This alloy is especially resistant to abrasion at a red heat.

Applications Keep Pace

Great as has been the stride made in the development of oxyacetylene cutting and welding equipment, the discovery of better and more economical methods of applying the equipment has kept pace. Improvements in technique have been made, and ideas that make for speed, economy and orderliness. For instance, a special truck for transporting three cylinders and an oxygen lance has been devised. This can move apparatus quickly to the scene of emergency. Piped distribution systems for oxygen and acetylene have come into general use. These require less constant attention than individual cylinders, and there is no danger of the gas supply being exhausetd in the midst of operation.

Provisions also are made for safety. The oxygen manifolds and acetylene generators are kept in special fireproof buildings where they are safe, out of the way, and where their maintenance will not interfere with plant operations. Underground or overhead pipes from these manifold houses convey the welding gases to outlets situated in the plant wherever they may be needed.

The multitude of ways whereby the oxyacetylene process is cutting costs in open-hearth steel plants is only indicated in this brief review. The process has a profound influence in construction, maintenance, operation, and dismantling. Without it our steel would be more costly and difficult to make. There is every indication that the oxyacetylene process will be even more essential to future development.

Welded Steel Construction

This large salt evaporator is but one of many jobs built up in Wellman's electrical welding department, noted for steel fabrication of the highest character.

ADVANTAGES OF WELDED STEEL CONSTRUCTION

(1) Saves you expensive patterns.

(2) Gives you stronger yet lighter construction.

(3) Eliminates blow-hole hazards.

(4) Saves considerable time in manufacture and facilitates quicker deliveries.

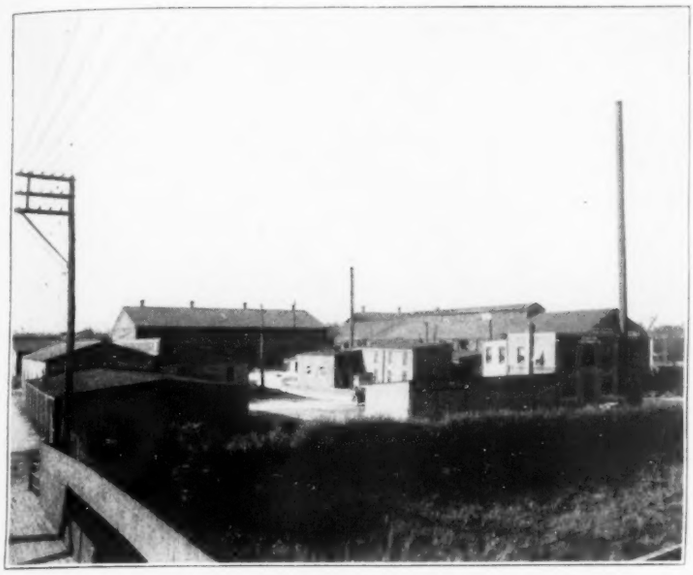
Without obligation, get Wellman's recommendations and figures on your next equipment needs.

WELLMAN PRODUCTS INCLUDE:

Mining Machinery
Coal and Ore Handling Bridges
Gantry Cranes
Special Cranes
Clamshell Buckets
Car Dumpers, . . . all types
Steel Mill Equipment
Charging Machines
Manipulators
Blast Furnace Skip Hoists
Gas Producers, Flues
Gas Reversing Valves
Safety Stops for Traveling Structures
Castings and Machine Work to customers' drawings.

THE WELLMAN ENGINEERING CO.
ENGINEERS CONSTRUCTORS MANUFACTURERS
CLEVELAND, OHIO
BIRMINGHAM • NEW YORK • MEXICO CITY

THEY CUT STEEL CASTINGS AND COSTS* TOO . . . . . with HARRIS CITY GAS TORCHES



Plant of Atlantic Steel Castings Company, Chester, Pennsylvania, monthly capacity 550 tons acid open hearth steel castings from 1 to 10,000 pounds.

The Atlantic Steel Castings Company of Chester, Pennsylvania adopted Harris City Gas Cutting Equipment. Pertinent facts on their experience are given in the letter reproduced below -

THE ATLANTIC STEEL CASTINGS COMPANY

CHESTER PENNSYLVANIA

August 2nd, 1935.

Harris Sales Company,
1428 S. 56th St.,
Philadelphia, Penna.

Gentlemen:

Having just completed a thorough and extensive check on the operation of your city gas cutting torches on the cutting of steel castings in our plant, we find that substantial savings are being made. For your information our acetylene cost per hour of cutting was $.55. The city gas cost per hour of cutting is approximately 7¢ which gives an economy of a little over 87% in favor of city gas.

In addition to making the substantial reduction in fuel cost, we found that our oxygen consumption has been decreased 15 to 20%. This last was quite surprising to us as we had been informed that our oxygen consumption would increase with the use of city gas. The cutting speed of your oxy-city gas torch is comparable with that of the oxy-acetylene torch and we are able to maintain our regular production schedule.

From the above you will see that we find city gas quite satisfactory for our work.

Yours very truly,

THE ATLANTIC STEEL CASTINGS COMPANY

RSM.E

R. S. Munson

Vice President.

Harris City Gas Torch cutting off a 9" riser at The Atlantic Steel Castings Company plant in Chester, Pennsylvania.

☆ Fuel cost per cutting hour is 7c with City Gas, against 55c with Acetylene. The Oxygen Saving Is 15% to 20%.

It will pay you to make a "thorough and extensive check" on your cutting costs.

• *Offices in all Principal Cities*

THE HARRIS CALORIFIC COMPANY

"Serving the Metal Industry since 1905"

CLEVELAND, OHIO

FOLLOW FLAME CUTTING WITH "*Shield-Arc*" WELDING FOR GREATER ECONOMY

IF you want to keep on cutting costs, after you have shut off the cutting torch, start welding with the new "*Shield-Arc.*" You'll find new savings . . . savings that old-style welders can never give you. Here's why:

"*Shield-Arc's*" uniform current makes the molten metal behave . . . Prevents splatter and waste of electrode...Produces more weld per pound of rod.

"*Shield-Arc's*" high capacity lets you turn on the heat...use larger electrodes...speed up the welding, often as much as 25%. And "*Shield-Arc*" delivers more welding per kilowatt hour. Its increased efficiency lowers power costs.

Run a few beads with a "*Shield-Arc*" and you'll discover its patented dual control of welding heat makes it easier to produce sound welds. And you'll find seven other features that will sell you "*Shield-Arc's*" ability to save you money.

You'll want the extra dividend "*Shield-Arc*" pays to every owner. It gives you a share in Lincoln's unsurpassed knowledge of arc welding and its application, in the benefits of Lincoln research and experiment, the guidance and assistance of Lincoln technicians on any welding problem. If you want to get the most for every dollar you spend for welding, find out now how much the "*Shield-Arc*" can save you. Write THE LINCOLN ELECTRIC COMPANY, Dept. Y-190, CLEVELAND, OHIO. Largest Manufacturers of Arc Welding Equipment in the World.

LINCOLN

"SHIELD-ARC" WELDERS

LAD: "Haven't you any sympathy for the under dog?"

POP: "Say, the under dog isn't looking for sympathy. What he wants is help. Any manufacturer losing out against lower production needs the help that '*Shield-Arc*' is guaranteed to give him."

Photo courtesy of Thomas Welding Laboratories, Detroit.

TIME saving—one of many cardinal advantages in the use of Rolled Steel for machine construction—was effectively demonstrated in the fabrication of this stamping press crown. Only 12 days (478 labor hours) were required for its complete fabrication! Rolled Steel construction permits immediate execution of design. No delays or waiting for parts. Incidentally, the weight of this crown was reduced exactly 55%—another feature worth your serious consideration!

Have you received our new booklet "Rolled Steel for Machine Construction?" Just off the press—profusely illustrated—full of helpful suggestions. Send for a copy.

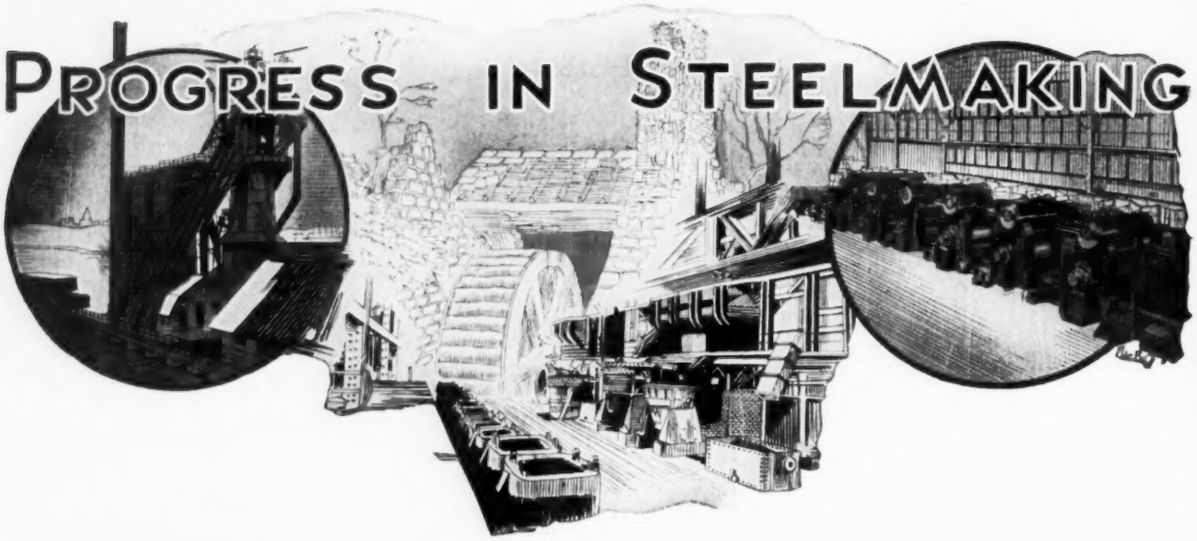
CARNEGIE-ILLINOIS STEEL CORPORATION

PITTSBURGH, PA. CHICAGO, ILL.

Rolled Structural Sections also produced by

COLUMBIA STEEL COMPANY, San Francisco TENNESSEE COAL, IRON and RAILROAD COMPANY, Birmingham 340

United States Steel Corporation Subsidiaries



New Cement Is Introduced

Introduction of a newly developed cement permits permanent connections to be made in pipes, tanks, engines, pumps and turbines at iron and steel plants. The cement is insoluble in water and petroleum products and, therefore, is suitable for joints exposed to these liquids. The best solvent for this compound is alcohol which is used when a thinner mixture is required.

• • •

Mill Greased Automatically

Temperatures of all bearings on the backup rolls of a broad hot strip mill in the Chicago district are recorded by a pyrometer. Readings are observed constantly by an attendant for any difficulty of bearing operation. The automatic centralized greasing system, which serves the mill, operates at 2000 pounds pressure per square inch. The quantity of grease fed to each bearing is regulated by a valve and the frequency of greasing the bearings simultaneously is regulated automatically from a central station every 15 minutes.

• • •

Affords 50-Heat Campaigns

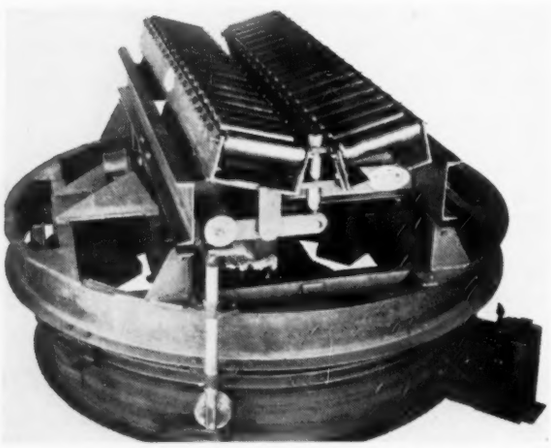
A plastic made from magnesitic dolomite with the addition of certain bonds which, in conjunction with the natural bonds, give it a hard cold set and a hard permanent hot set, now is being marketed. The new refractory is finding wide use for open-hearth furnace tap holes; back, front and monkey walls; at the top of banks and on the port ends; and, for other places where basic and neutral refractories are subject to excessive wear or corrosion. The product also is used for basic electric melting furnaces, hot metal mixers, soaking pits, forge and heating furnaces, and for ladle linings. In open-hearth tap holes it has afforded campaigns of 50 heats without replacement. The product not only has long life as a ladle lining, particularly with manganese steel, but tends to reduce nonmetallic inclusions in the steel. The plastic is shipped dry and is prepared by adding water. It may be shoveled, troweled or rammed into place or it can be applied with a cement gun.

• • •

Increases Yield of Billets

Mechanical jarring affords a deeper and more uniform rim in bessemer ingots and results in more consistent production and quality from heat to heat, according to the experience of a bessemer steelmaker in the Pittsburgh district. Rimming bessemer ingots by jarring in grades that under ordinary conditions are semi-killed effected an increase in the billet yield of 1.6 per cent, a reduction in chipping rejections of 25 per cent and an increase of 3 tons per man day in the rate of chipping.

Electrically-Operated Turntable Serves Broad Strip Mills

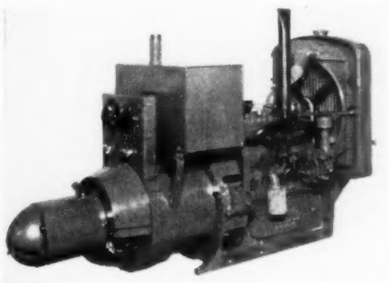


COILS OF STRIP ARE MANIPULATED WITH EASE—A 7-foot diameter turntable suitable for revolving 6-ton coils of strip steel prior to pickling, has been made available for the finishing end of broad strip mills. The unit is driven by a 5-horsepower 1200 revolutions per minute Westinghouse motor coupled to a vertical speed reducer and spur gears. Its purpose is to receive from a straight line of conveyers 12,000-pound coils of strip steel, which are placed on the conveyer from storage at random. The turntable serves to place the coils of steel with their loose ends in proper position to enter the continuous pickler. Since the coils are conveyed on their side, core axis horizontal, a troughed section of a heavy-duty conveyer is used to handle this circular shape. The individual rollers in the conveyer section are ball bearing—grease packed type fitted with grease fittings for periodical lubrication. The rollers are 3⅝ inches diameter, each having a continuous load rating of 2000 pounds. The turntable is a product of the Mathews Conveyor Co., Ellwood City, Pa.

NEW EQUIPMENT

Engine-Driven Welder—

Lincoln Electric Co., Cleveland, has announced a new 200-ampere engine-driven "Shield Arc" welder which supplies a uniform current for welding with bare or heavily coated shielded arc type electrodes in all sizes up to ¼ inch. The welding current range of this machine, shown herewith, is from 60 to 250 amperes. Its generator is the single operator variable voltage type with completely laminated magnetic circuit and equipped with interpoles. The patented Lincoln dual control of welding current is provided by adjustment of both series and shunt fields. A generator field rheostat and a current regulating switch are mounted in vertical position on a "dead-front" steel control panel.

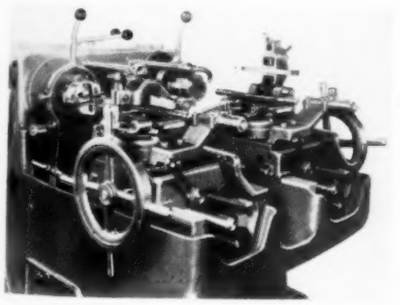


Lincoln 200-ampere special engine-driven electric arc welder

• • •

Work Aligning and Indexing Fixture—

Landis Machine Co., Waynesboro, Pa., has developed a novel fixture for application to its Landmaco machines, for threading parts that have a thread on each end and requiring alignment and concentricity of both threads. In addition to providing for alignment the fixture also indexes automatically so that both ends can be threaded with one gripping. While the application shown in the accompanying illustration was used for threading automobile tie rods, the fixture can be adapted readily to other work of a similar nature. It can be removed and the machine converted into a standard threading unit by applying a standard carriage and vise.

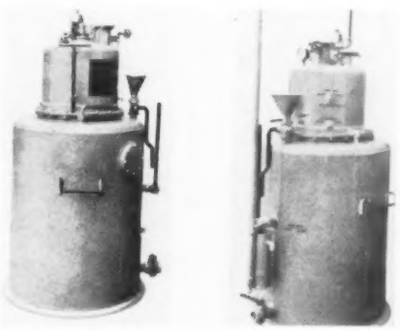


Landis fixture is a self-aligning and indexing device for threading work on both ends

• • •

Acetylene Generator—

Linde Air Products Co., 30 East Forty-second street, New York, is announcing a new small size medium pressure acetylene generator for portable or stationary service. Shown herewith, it has a 50-pound carbide capacity with a double rating of 100 cubic feet of acetylene per hour. Developed for portable or stationary use with any type of oxyacetylene cutting or welding apparatus, the unit incorporates special automatic controls which make it particularly safe to operate. There is practically no exposed piping, and such operating mechanisms as the feed control, carbide hopper, hydraulic back pressure valve, and filter all are assembled within the dome-shaped top of the generator.



Oxweld medium pressure generator. Unit at left is for portable service while that at right is equipped for stationary service

A handwheel at the generator top makes it possible to control the carbide feed so that acetylene at any desired pressure up to 14 pounds per square inch may be obtained. The carbide feeding mechanism incorporates the gravity type, pressure diaphragm control principle.

Niagara master series A-1 ¾ inclinable press has improved features

• • •

Inclinable Press—

Niagara Machine & Tool Works, 637-697 Northland avenue, Buffalo, announces a 1¾-inch diameter shaft inclinable press, shown above. Among its advanced features is the exclusive design of its one-piece high tensile cast iron frame constructed to assure complete rigidity and resistance to vertical, horizontal and torsional stresses.

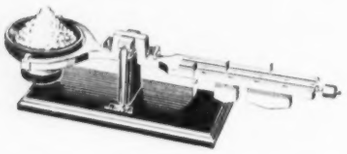
A 14-point engagement sleeve clutch provides instant engagement, maximum number of strokes per minute, safety and long life. A positive locking device is built in the throwout to prevent accidental engagement of the clutch when setting dies. A single stroke, nonrepeat device is furnished to prevent a second stroke of the slide even if the treadle is held down. If desired, however, the single stroke mechanism may be disconnected to allow continuous oper-

ation. A convenient, easily adjusted inclinable device is provided to tilt the press in the desired working position.

• • •

Balance—

Chemical Publishing Co. of New York Inc., 175 Fifth avenue, New York, is announcing a Bennett balance for laboratory, factory and field use. The unit, shown herewith, weighs up to 100 grams and has a sensitivity of 1/100 gram. It is rugged, compact, is less than one



Bennett balance is a rugged and compact device

pound in weight and is about 12 inches long. There are no loose weights to be lost. A special beam arrest prevents excessive wear of the knife edge, and centers the latter automatically for each weighing.

• • •

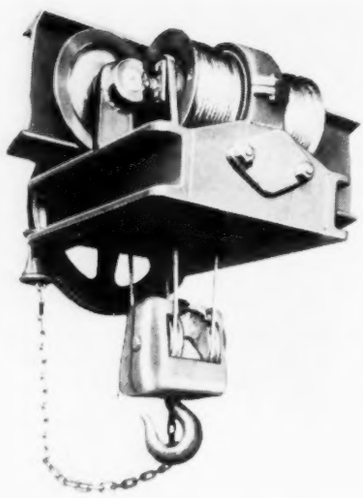
Fire Hydrant—

Columbian Iron Works, Chattanooga, division of Mueller Co., Decatur, Ill., has brought out an improved fire hydrant with a special safety flange at the ground line. Any accidental collision with the unit breaks the weakened section which is not a part of the regular hydrant barrel.

Columbian fire hydrant embodying advanced features

A bronze coupling joining two sections of the main stem permits this breakage to occur without damage to the stem sections. Thus the hydrant, shown herewith, can be repaired above the groundline, obviating any necessity of digging down to the water supply line.

In addition to this feature, the hydrant embodies a self-oiling reservoir in the top of the bonnet which automatically lubricates all moving parts. Nozzles can be swiveled in any direction by simply loosening the bolts at the pavement line. All parts can be removed through the top of the hydrant.



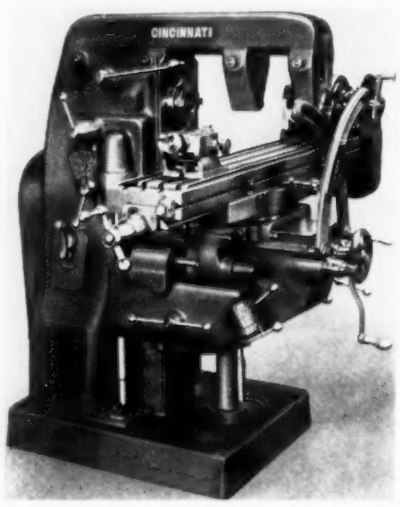
Shaw-Box type WR hand-operated trolley hoist

• • •

Hand-Operated Trolley Hoist

Shaw-Box Crane & Hoist Co. Inc., Muskegon, Mich., recently developed a hand-operated trolley hoist designed primarily for use on its line of single girder cranes; however, it can be secured for use on overhead I-beam monorail systems. An exceptionally high hook lift is obtained on all sizes of the unit, shown directly above.

On a 2-ton capacity hoist the hook in highest position is only 9 7/8 inches below the track on which it operates. The distance is less on smaller capacity hoists. Effort required to raise capacity loads is unusually low, one man being able to handle loads up to two tons by pulling on the endless hand chain.



Cincinnati No. 2 L-type universal milling machine

• • •

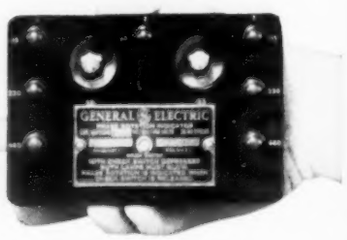
Universal Miller—

Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, has introduced a new No. 2 L-type universal miller, a toolroom machine especially designed for job shop quantities of the average type of milling machine work. The unit, shown herewith, has 15 spindle speeds, ranging from 23 to 1200 revolutions per minute, arranged in approximate geometrical progression. Feed rates are selected by shifting two levers on the left-hand side of the knee. Twelve feeds are available, the longitudinal travel ranging from 5/8 to 30 inches per minute.

• • •

Phase Rotation Indicator—

General Electric Co., Schenectady, N. Y., is bringing out a new type phase rotation indicator. This instrument, shown herewith, will be found useful in three-phase testing and installation work, such as the testing and installation of three-phase meters and motors.



GE phase rotation indicator

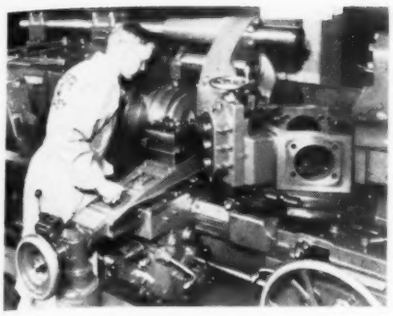
The new phase rotation indicator employs two neon glow lamps and a simple circuit which requires no adjustment. Suitable terminals are provided for connection to 110, 220, or 440-volt circuits. Operation is simple and sure.

• • •

Universal Turret Lathe

Warner & Swasey Co., Cleveland, recently brought out a new 4-A universal turret lathe in which all shafts of the head are mounted one above the other to the rear of the spindle, thus placing the gear train entirely to the rear. This machine, shown on page 103, is offered in 8 and 9-inch spindle capacities and 28 1/4-inch swing. Increased depth of bed section reaches down almost to the chip pan.

New features of construction offer increased capacity for absorbing the strains in overhanging tools. A direct reading indicator in the head gear shift affords increased ease of



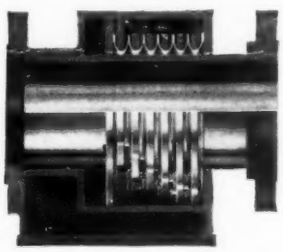
4-A universal turret lathe developed by Warner & Swasey Co.

operation and enables the operator to pick the desired spindle speed without referring to diagrams or charts. Rapid traverse now is offered as optional equipment for the cross slide. The independent lead screw is an important feature for threading operations.

• • •

Packless Expansion Joint—

American District Steam Co., North Tonawanda, N. Y., is announcing a new packless expansion joint known as the U-ring type. It is based on a new principle for controlling pipe expansion in steam and hot water



Packless expansion joint developed by American District Steam Co., is based on a new principle of controlling pipe expansion

lines, or pipelines conveying gas or fluids subject to temperature variations. The new development, shown herewith, is guided at three points to permit the sleeve to move freely without binding, and is available for pressures to 400 pounds and temperatures to 800 degrees Fahr. Flanged or beveled ends for welding directly into the pipeline, can be furnished.

• • •

Wire Grips—

Bull Dog Electric Products Co., 7610 Jos. Campau avenue, Detroit, recently introduced solderless cable terminal lugs known as wire grips. Only five sizes are necessary to cover the entire range of wires and cables from No. 14 to 1,000,000 CM. Pure electrolytic copper is used for the composing metal, assuring high conductivity. Clear wire holes give positive visual evidence of the degree of contact.

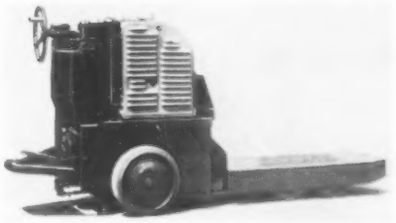
Bull dog solderless cable terminal lug or wire grip

• • •

Surface Armor—

William F. Klemp Co., 6624 South Melvina avenue, Chicago, is announcing "Hexteel" surface armor for prolonging the life of all heavy-duty surfaces of industrial floors, aisles, loading platforms, driveways, walks, etc., where concrete, mastic or composition surfacing material is applied. Economy is achieved by standardization of units of 3 to 10 foot size. This makes it possible to lay out the armor, shown herewith, on 30 square foot sections or multiples thereof. Simple clinching together of units with a tool supplied, brings connecting time down to a minimum. Bars have a hole in each side of the "hex" where surfacing materials bonds through to the adjoining "hex," making a solid mass.

KLEMP "Hexteel" surface armor being laid to provide an industrial floor. In this instance it is applied to a concrete base and then filled with concrete. The new material also is used extensively on concrete bases and filled with hot or cold mastic



Mercury heavy-duty truck equipped with gas-electric unit

• • •

Heavy-Duty Electric Truck—

Mercury Mfg. Co., 4100 South Halsted street, Chicago, is introducing a low lift industrial truck with a capacity of 10,000 pounds. Platform elevation is accomplished hydraulically. Features include a tandem trail axle employing four wheels, location of the brakes in the drive wheels, automatic overload protection, etc. The truck shown above is equipped with a gas-electric unit for continuous operation, although it is standardly built with a compartment to accommodate necessary cells for storage battery operation.

Miller combination reflector permits use of incandescent lamps along with a mercury vapor lamp

• • •

Combination Lamp Reflector—

Miller Co., Meriden, Conn., is offering a combination high intensity mercury vapor and incandescent lamp reflector, shown above. The design permits the use of ordinary incandescent lamps along with the mercury vapor lamp in a single fixture. Color correction with these combination units has several distinct advantages over systems where the lighting fixtures are alternately mercury vapor and incandescent, the company claims.

Machine Tool Builders Stress Sales, Publicity

(*Concluded from Page* 24)

ning, which requires research. Sales laboratories, contended Mr. Dick, are as essential as technical laboratories.

The second step is systematic origination in sales work. Prospective business is of two kinds—available business, where buyer and seller both know that the buyer needs machine tools, and originative business, where the seller knows but the buyer does not know that he needs machines. Mr. Dick urged machine tool builders to do more originative selling.

The third basic step is to insure orderly and controlled sales operations.

Vaso Trivanovitch, assistant to the president, National Industrial Conference board, New York, in speaking on "Machinery, Employment and Purchasing Power," compared three periods in American history to show the changing character of the nation's economic problems.

In 1789, in Washington's time, every family produced its own needs. There were no depressions and no unemployment. Practically 100 per cent of the people were engaged in making the goods they used.

Machine Frees Labor

During the Civil war period, trade and commerce had developed to the extent that the number of people engaged in producing goods was about 80 per cent of the total. The remaining 20 per cent were in the growing fields of transportation and other branches of trade.

Today the situation has changed to the extent that only 53 per cent of the population is producing goods and 47 per cent is in the service of trade, commerce, etc.

Mr. Trivanovitch said that these changes are due to the influence of machines and to the increased standard of living. Machines increased the output of men and made it possible to release more and more workers to service.

Mr. Trivanovitch said that enemies of the machine sometimes admit that the national income has increased, but contend that the "rich are getting richer and the poor poorer." His answer to this charge is that labor's share of the national income, in wages and salaries, increased from 53 per cent in 1899 to 66 per cent in 1934. During that period the share of persons in business for themselves declined and the share received in the form of interest and dividends remained unchanged.

He insisted that the problem is not so much in how the income is shared as in how to increase the amount to be shared. This can be done by utilizing the benefits of machinery. Increase the national income sufficiently and you increase the annual income of workers. He then presented detailed figures to show that the tendency of annual income from 1899 to 1929 was steadily upward.

Again, opponents of the machine may say "Yes, this is true, but the increase has been accomplished at the terrific price of widespread unemployment." Mr. Trivanovitch contended that the belief that the machine creates permanent unemployment has no basis of fact. On the contrary, the figures show clearly that the percentage of the population employed by industry has increased.

The speaker said he had heard statements to the effect that a return of activity to 1929 levels still would find serious unemployment. He took issue with this belief, pointing out that in June, 1935, when the volume of business in the manufacturing industries was 71 per cent of the 1929 volume, employment was 76 per cent of 1929 employment. He also explained that as more men are hired, the efficiency of labor declines. Putting all the factors together, he declared that when volume gets back to 1929 levels, industry will be employing at least as many workers as it did in 1929.

New Treasurer, N.M.T.B.A.

Henry C. Pierle

In discussing "Financing Equipment Purchases," S. P. Maddock, vice president, Commercial Investment Trust, Inc., New York, urged machine tool builders to take advantage of installment selling under the amended federal housing act. It provides credit insurance for approved financial institutions for the installation of machinery and equipment on real property. Credits may extend for 60 months, debt must be amortized in equal monthly payments and a down payment is desirable but not essential. The seller should sell on a title retention contract. Finance companies will buy such obligations of the purchasers without recourse to the sellers.

Mr. Mattock declared that installment selling is being used more and more by some of the largest and best companies. He cited the case of a company which enjoys a high credit rating, has $400,000 in cash and governments, has good banking lines—unused, and has a good record of earnings. This company recently contemplated the purchase of a $20,000 machine. The vice president said, "If I can buy that tool on 60-month terms at the rate you specify, I'll do so now; otherwise I will wait until spring and get the feel of things then."

Affords Incentive To Buy

Mr. Maddock used this instance to illustrate the necessity of providing incentives for equipment buyers to take action now.

The report of the committee on apprentice training was presented by Everard Stubbs, factory manager, Fellows Gear Shaper Co., Springfield, Vt. He touched upon the shortage of skilled workers and emphasized the need of training more men.

The committee recommended that machine tool builders consider five methods of training:

1. Modern apprentice courses, such as conducted by Brown & Sharpe Mfg. Co., Cincinnati Milling Machine Co., General Electric Co., Ford Motor Co., National Metal Trades association, International Correspondence Schools, etc.
2. Trade schools.
3. Mechanic arts courses.
4. Co-operative courses, such as offered by the University of Cincinnati.
5. Short courses (vestibule schools) for the rapid training of men for specialized work.

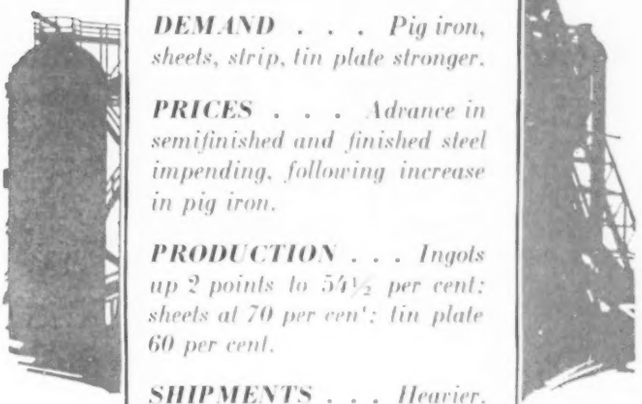
The report showed that 21 shops employing 15,500 workers have 600 apprentices, or 3.8 per cent of the force. Some machine tool builders are utilizing three of the five training methods.

W. E. Whipp presented the report of the committee on marketing, in which it was recommended that the publicity work of the association be continued. The convention approved this proposal and appropriated an amount to carry on the work. It will be handled by Roberts Everett Associates Inc., New York.

N. W. Pickering, president, Farrel-Birmingham Co. Inc., Buffalo, spoke on "MAPI Activities." He described the work of the Machinery and Allied Products institute and emphasized the fact that its activities supplement rather than duplicate those of organizaions such as the National Association of Manufacturers, United States Chamber of Commerce, etc.

Steel Price Rise Impending; Rate Up to 54½

Markets More Active; October Pig Iron and Ingots Rise; Wage Increase Studied



MARKET IN TABLOID

DEMAND . . . *Pig iron, sheets, strip, tin plate stronger.*

PRICES . . . *Advance in semifinished and finished steel impending, following increase in pig iron.*

PRODUCTION . . . *Ingots up 2 points to 54½ per cent; sheets at 70 per cent; tin plate 60 per cent.*

SHIPMENTS . . . *Heavier.*

FOLLOWING the increase of $1 a ton in pig iron prices, now in effect in practically all districts, and further acceleration in iron and steel demand, steelmakers late last week indicated that an advance in semifinished steel and finished steel products impends.

While specific time and amounts were still to be announced, reports were that for semifinished steel the rise will be $1 to $2 a ton, and for finished products $1. As in the case of pig iron, it was assumed that consumers would be given opportunity to cover forward requirements before the effective date.

For semifinished this will be the first change in prices since July, 1934, when they were raised $1 to $2. Finished steel prices were raised in June last year, revised downward in July, at which levels they held until September this year, when base prices of some grades were reduced while quantity extras were increased.

With the contemplated revisions, the entire iron and steel price structure will be on a higher basis. Advances have been made in coal, coke, fluorspar, and while scrap prices now show stability rather than any definite trend, they are $2 to $3 a ton higher than last spring.

Topping it all, steelworks employe representation groups have been pushing for a 15 per cent wage increase, and steelmakers now are understood to be considering some adjustment.

Steelworks operations last week rose 2 points to 54½ per cent, closing a month which averaged about 52.2 per cent, the same as February. Some recession may develop this week, as a reduction is scheduled at Youngstown. Official figures to be announced this week will show steel ingot production for this year to date 16 per cent above the entire output in 1934.

Similarly, STEEL's pig iron compilation shows an output of 16,859,924 gross tons for the ten months this year, compared with 15,977,679 tons in all 1934. Daily average production in October was 63,858 gross tons, 8.2 per cent higher than in September, and the month's total was 1,979,609 tons, 11.8 per cent over September, and largest since May, 1934. A net gain of 10 stacks was made in the month, to 114 operating Oct. 31.

The industrial tempo seems to be quickening. Automobile manufacturers last week stepped up production to 77,000 units, from 62,000 in the preceding week, and as if encouraged by market prospects opened up on steel specifications, booking numerous sheet and strip mills to capacity on full-finished grades through November, lifting the general average of sheet mill operations to 70 per cent.

An unexpected influx of tin plate orders from canmakers and for export reversed the three-week downtrend in tin plate production, raising it 10 points to 60 per cent. One canmaker placed 3000 tons for beer containers.

Larger inquiries developed for steel for public works projects, including 10,000 tons for bridges at Chicago. Shape awards for the week rose moderately to 23,041 tons, with 3500 tons for a New York city high school and 3000 tons as the final order for the Golden Gate bridge, San Francisco. Pittsburgh builders are bidding on 45 barges requiring 8000 tons of plates.

Northern Pacific came into the market for 12,000 to 16,000 tons of rails, and the Reading Co. ordered 16 steel coaches and 100 automobile box cars.

Lake Superior iron ore shippers are closing their season, the United States Steel Corp. taking all its vessels out of the ore trade Nov. 4, with others continuing until Nov. 20. The ore movement for the season will be 28,000,000 tons, 27 per cent over 1934.

Chicago steelworks operations last week advanced 1 point to 55; Wheeling 6 to 84; Cleveland 8 to 72; Buffalo 2 to 42; eastern Pennsylvania ½-point to 38½; New England 2 to 70; Detroit 6 to 94; Youngstown 1 to 63. Pittsburgh held at 47; Birmingham 58½.

STEEL's iron and steel price composite rose 13 cents to $32.98; the finished steel index was unchanged at $53.70, and the scrap composite remained $12.67.

COMPOSITE MARKET AVERAGES

	Nov. 2	Oct. 26	Oct. 19	One Month Ago Oct., 1935	Three Months Ago Aug., 1935	One Year Ago Nov., 1934	Five Years Ago Nov., 1930
Iron and Steel	$32.98	$32.85	$32.83	$32.84	$32.68	$32.15	$31.95
Finished Steel	53.70	53.70	53.70	53.70	54.02	54.00	49.62
Steelworks Scrap	12.67	12.67	12.71	12.72	12.05	9.82	11.17

Iron and Steel Composite: Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel hot strip, and cast iron pipe at representative centers. Finished Steel Composite: Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite: Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Nov. 2, 1935	Oct. 1935	Aug. 1935	Nov. 1934
Steel bars, Pittsburgh	1.85c	1.85c	1.80c	1.80c
Steel bars, Chicago	1.90	1.90	1.85	1.85
Steel bars, Philadelphia	2.16	2.16	2.11	2.09
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.75
Shapes, Pittsburgh	1.80	1.80	1.80	1.80
Shapes, Philadelphia	2.01½	2.01½	2.01½	2.00½
Shapes, Chicago	1.85	1.85	1.85	1.85
Tank plates, Pittsburgh	1.80	1.80	1.80	1.80
Tank plates, Philadelphia	2.00	1.99	1.99	1.98½
Tank plates, Chicago	1.85	1.85	1.85	1.85
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.85
Sheets, No. 24, hot ann., Pitts.	2.10	2.40	2.40	2.40
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	3.10
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.95
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.55
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	3.20
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.40	2.40	2.55	2.60

Semifinished Material

Sheet bars, open-hearth, Youngs.	$28.00	$28.00	$28.00	$28.00
Sheet bars, open-hearth, Pitts.	28.00	28.00	28.00	28.00
Billets, open-hearth, Pittsburgh	27.00	27.00	27.00	27.00
Wire rods, Pittsburgh	38.00	38.00	38.00	38.00

Pig Iron

Bessemer, del. Pittsburgh	20.81	$19.81	$19.81	$19.76
Basic, Valley	19.00	18.00	18.00	18.00
Basic, eastern, del. eastern Pa.	20.76	19.81	19.81	19.76
No. 2 foundry, del. Pittsburgh	20.31	19.31	19.31	19.26
No. 2 foundry, Chicago	19.50	18.75	18.50	18.50
Southern No. 2, Birmingham	14.50	14.50	14.50	14.50
No. 2X eastern, del. Philadelphia	21.68	20.68	20.68	20.63
Malleable, Valley	19.50	18.50	18.50	18.50
Malleable, Chicago	19.50	18.75	18.50	18.50
Lake Superior charcoal del. Chi.	25.25	24.90	24.25	24.04
Ferromanganese, del. Pittsburgh	90.13	90.13	90.13	89.79
Gray forge, del. Pittsburgh	19.67	18.67	18.67	18.63

Scrap

Heavy melting steel, Pittsburgh	$13.25	$13.65	$13.25	$11.15
Heavy melt. steel, No. 2, east. Pa.	11.00	11.00	10.50	8.35
Heavy melting steel, Chicago	12.50	12.50	12.35	9.10
Rails for rolling, Chicago	14.00	14.00	13.65	10.35
Railroad steel specialties, Chicago	13.25	13.50	13.55	10.05

Coke

Connellsville, furnace, ovens	$3.55	$3.55	$3.25	$3.60
Connellsville, foundry, ovens	4.35	4.35	4.00	4.60
Chicago, by-product foundry, del.	9.75	9.75	9.25	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Sheet Steel

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.85c
Gary	1.95c
Chicago, delivered	1.98c
New York, del.	2.20c
Philadelphia, del.	2.16c
Birmingham	2.00c
St. Louis, del.	2.18c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, delivered	2.60c
New York, del.	2.75c
Philadelphia, del.	2.71c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered	3.23c
Philadelphia, del.	3.41c
New York, del.	3.45c
Birmingham	3.25c
St. Louis, del.	3.43c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.08c

Cold Rolled No. 10

Pittsburgh	2.50c
Gary	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.81c
New York, del.	2.85c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.95c
Gary	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.26c
New York, del.	3.30c

Enameling Sheets

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c
Gary, No. 10	2.60c
Gary, No. 20	3.20c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base (box) Pittsburgh	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold strip	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.09c
Philadelphia, del.	1.99c
Boston, delivered	2.22c
Buffalo, delivered	2.05c
Chicago or Gary	1.85c
Cleveland, del.	1.99½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.08c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.01½c
New York, del.	2.06½c
Boston, delivered	2.20½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	2.00c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

(Base, 5 to 25 tons)

Pittsburgh	1.85c
Chicago or Gary	1.90c
Duluth	2.00c
Birmingham	2.00c
Cleveland	1.90c
Buffalo	1.95c
Detroit, delivered	2.00c
Pacific ports, f.o.b. cars, dock	2.40c
Philadelphia, del.	2.16c
Boston, delivered	2.27c
New York, del.	2.20c
Pitts., forg. qual.	2.10c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

Iron

Troy, N. Y.	1.70c
Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	2.06c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.36c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight carloads; less than straight carloads take trade quantity extras; 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base Pitts.-Cleve. 100 lb. keg.	
Standard wire nails	$2.40
Cement coated nails	2.40
Galvanized nails, 15 gage and coarser	4.40
do. finer than 15 gage	4.90

(Per pound)

Polished staples	3.10c
Galvanized fence staples	3.35c
Barbed wire, galv.	2.80c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$58.00

To Manufacturing Trade

Plain wire, 6-9 gage	2.30c

Anderson, Ind. (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting

Base, Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.	1.95c
20,000 to 59,999 lbs.	1.90c
60,000 to 99,999 lbs.	1.85c
100,000 lbs. and over	1.82½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.50
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni. 1.05
5100 0.80-1.10 Cr. 0.45
5100 Cr. spring base
6100 bars 1.20
6100 spring 0.70
Cr., Ni., Van. 1.50
Carbon Van. 0.95
9250 carbon base plus extras

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23⅛-in.	
Pittsburgh	1.85c
Chicago or Gary	1.95c
Birmingham base	2.00c
Detroit, delivered	2.05c
Philadelphia, del.	2.16c
New York, del.	2.20c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold-strip strip, Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts.	
20-45 lbs.	$28.00
45-50 lbs.	$25.00
50-60 lbs.	$26.00
70-75 lbs.	$24.50
80-90 lbs.	$26.00
100 lbs.	$27.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll, qual.	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel	2.10c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $2; 16 and 20 lbs., up $1; 12 lbs. up $2; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.

Carriage Bolts

All sizes, cut thread	75 off
Rolled thread, ½ x 6, smaller	75 off

Machine Bolts

All sizes, cut thread lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts	75 off
Tire bolts	60 off
Stove bolts, 75 off in pkgs.; 83 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.	
Rolled thread machine, ½ x 6, smaller	75 off
Step bolts	70 off
Elevator bolts	70 off

Nuts

S.A.E. semifinished hex.; ½ to ⅞-inch	75 off
Do., ½ to 1-inch	75 off
Do., over 1-inch	70 off

Hexagon Cap Screws

Milled	80-10-10 off
Upset, 1-in., smaller	85 off

Square Head Set Screws

Upset, 1-in., smaller	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila., to jobbers & large nut, bolt mfrs.	$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, expect on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ points less. Wrought pipe, Pittsburgh.

Butt Weld

In.	Blk.	Galv.
Steel		
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55
Iron		
½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

Lap Weld

Steel		
2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½
Iron		
2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel	
½, butt weld	57½
⅛-inch, butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63
Iron	

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts. Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are noted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound. Less-carloads revised as of July 1, 1935, card.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$39.00-40.00
4-in., Birmingham	42.00-43.00
4-in., Chicago	50.40-51.40
6 to 24-in. Chicago	47.40-48.40
6-in. & over, east. fdy.	43.00
Do., 4-in.	46.00

Class A pipe $3 over Class B. Stnd. fitgs., Birm. base $100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.67
Duluth	31.00

Forging Billets

6 x 6 to 9 x 9-in., base

Pitts., Chi., Buff.	35.00
Forging, Duluth	37.00

Sheet Bars

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	28.00

Slabs

Pitts., Cleve., Young.	27.00

Wire Rods

(Common; combination up $2)

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point	1.70c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.55- 3.75
Connellsville, fdry.	4.35- 4.50
Connel., prem. fdry.	5.50- 5.75
New River fdry.	6.00
Wise county fdry.	4.45- 5.00
Wise county fur.	4.00- 4.50

By-Product Foundry

Newark, N. J., del.	9.20- 9.65
Chi., ov., outside del.	9.00
Chicago, del.	9.75
New England, del.	11.50
St. Louis, del.	10.00
Birmingham, ovens	6.00
Indianapolis, del.	9.40
Cincinnati, del.	9.50
Cleveland, del.	9.75
Buffalo, ovens	7.50- 8.00
Detroit, ov., out. del.	9.00
Philadelphia, del.	9.03
Terre Haute, Ind., del.	9.50

Coke By-Products

Per gallon, producers' plants.

	Tank lots	Spot
Pure and 90% benzol	15.00c	
Toluol	30.00c	
Solvent naphtha	30.00c	
Commercial xylol	30.00c	

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls., to jobbers	4.50c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices, ½-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
*Bethlehem, Pa.	$20.50	$21.00	$19.00	$21.50
*Birdsboro, Pa.	20.50	21.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	14.50	13.50	20.00
*Buffalo	19.50	20.00	18.50	20.50
Chicago	19.50	19.50	19.00	20.00
*Cleveland	19.50	19.50	19.00	20.00
*Detroit	19.50	19.50	19.00	20.00
Duluth	20.00	20.00	.....	20.50
*Erie, Pa.	19.50	20.00	19.00	20.50
*Everett, Mass.	20.50	21.00	20.00	21.50
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
*Neville Island, Pa.	19.50	19.50	19.00	20.00
Provo, Utah	17.50	.....	17.00	.....
*Sharpsville, Pa.	19.50	19.50	19.00	20.00
*Sparrows Point, Md.	20.50	.....	20.50	.....
*Swedeland, Pa.	20.50	21.00	20.00	21.50
*Toledo, O.	19.50	19.50	19.00	20.00
*Youngstown, O.	19.50	19.50	19.00	20.00
Delivered from Basing Points:				
*Akron, O., from Cleveland	20.76	20.76	26.26	21.26
*Baltimore from Birmingham	21.08	.....	19.96	.....
*Boston from Birmingham	20.62	.....	20.50	.....
*Boston from Everett, Mass.	21.00	21.50	20.50	22.00
*Boston from Buffalo	21.00	21.50	20.50	22.00
*Brooklyn, N. Y., from Bethlehem	22.93	23.43	.....	.....
*Brooklyn, N. Y., from Bmghm.	22.50	.....	.....	.....
*Canton, O., from Cleveland	20.76	20.76	20.26	21.26
*Chicago from Birmingham	†19.72	.....	19.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
*Cincinnati from Birmingham	20.38	.....	20.40	.....
*Cleveland from Birmingham	19.62	.....	19.12	.....
Indianapolis from Hamilton, O.	20.93	20.93	20.43	21.43
*Mansfield, O., from Toledo, O.	21.26	21.26	20.76	21.76
Milwaukee from Chicago	20.57	20.57	20.07	21.07
*Muskegon, Mich., from Chicago Toledo or Detroit	22.60	22.60	22.10	23.10
*Newark, N. J., from Birmingham	21.61	.....	.....	.....
*Newark, N. J., from Bethlehem	21.99	22.49	.....	.....
*Philadelphia from Birmingham	20.93	.....	20.81	.....
*Philadelphia from Swedeland, Pa.	21.31	21.81	20.81	.....
Pittsburgh district from Neville Island	Neville base plus 67c, 81c and $1.21 switching charges			
*Saginaw, Mich., from Detroit	21.75	21.75	21.25	21.25

Delivered from Basing Points:	No. 2 Fdry	Malleable	Basic	Bessemer
St. Louis, northern	20.00	20.00	19.50	.....
*St. Louis from Birmingham	†19.62	.....	19.50	.....
St. Paul from Duluth	21.94	21.94	.....	22.44

†Over 0.70 phos.

Low Phos

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $24.00. Phila. base, standard and copper bearing, $25.13.

Gray Forge		Charcoal	
*Valley furnace	19.00	Lake Superior fur.	$22.00
*Pitts. dist. fur.	19.00	Do., del. Chicago	25.25
		*Lyles, Tenn.	22.50

Silvery†

Jackson County, O., base; 6% $22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices, up $1.25.

Bessemer Ferrosilicon†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon: 2 to 3%, $1 per ton additional; each unit over 3%, $1 per ton additional.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$55.00

First Quality

Pa., Ill., Md., Mo.	$45.00
Alabama, Ga., Ky.	$40.00-45.00

Second Quality

Pa., Ill., Ky., Md., Mo.	40.00
Ga., Ala.	35.00

Ohio

First quality	$40.00
Intermediary	37.00
Second quality	28.00

Malleable Bung Brick

All bases	50.00

Silica Brick

Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$45.00
Chemically bonded chrome brick	45.00
Magnesite brick	65.00
Chemically bonded magnesite brick	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$20.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$16.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base	85.00
Do., del. Pittsb'gh	90.13
Spiegeleisen, 19-20% dom. Palmerton, Pa., spot†	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent	126-130.00
Spot, $5 a ton higher.	
Silicoman., 2½ carb.	90.00
2% carbon, 95.00; 1%, 105.00	
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.00
Ferrotungsten, stand., lb. con. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont.	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
Do., under 1 ton.	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply.

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Chinese Spot, N. Y.	Nickel Cathodes
Oct. 26	9.25	9.37½	8.85	51.75	48.75	4.50	4.35	4.85	*19.00	16.00	35.00
Oct. 28	9.25	9.37½	8.85	51.00	48.50	4.50	4.35	4.85	*19.00	16.00	35.00
Oct. 29	9.25	9.37½	8.85	50.75	48.12½	4.50	4.35	4.85	*19.00	16.00	35.00
Oct. 30	9.25	9.37½	8.85	50.75	48.00	4.50	4.35	4.85	*19.00	16.00	35.00
Oct. 31	9.25	9.37½	8.85	51.50	48.65	4.50	4.35	4.85	*19.00	15.00	35.00
Nov. 1	9.25	9.37½	8.85	51.75	48.37½	4.50	4.35	4.85	*19.00	15.00	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.00c Conn. copper.

Sheets	
Yellow brass (high)	14.62½
Copper hot rolled	16.25
Lead cut to jobbers	8.25
Zinc, 100-lb. base	9.50
Tubes	
High yellow brass	16.62½
Seamless copper	16.75
Rods	
High yelow brass	13.12½
Copper, hot rolled	13.50
Anodes	
Copper untrimmed	14.00
Wire	
Yellow brass (high)	15.12½

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
New York	5.50- 5.75
Cleveland	5.87½-6.12½
Chicago	5.87½- 6.00
St. Louis	6.00- 6.25
Heavy Copper and Wire	
New York, No. 1	6.75- 7.00
Chicago, No. 1	6.87½-7.12½
Cleveland	6.75- 7.00
St. Louis, No. 1	7.25- 7.37½
Composition Brass Borings	
New York	5.00- 5.25
Light Copper	
New York	5.75- 6.00
Chicago	5.37½-5.62½
Cleveland	5.75- 6.00
St. Louis	6.00- 6.25
Light Brass	
Chicago	3.25- 3.50
Cleveland	3.12½-3.37½
St. Louis	3.50- 3.75
Lead	
New York	3.50- 3.75
Cleveland	3.25- 3.50
Chicago	3.37½-3.62½
St. Louis	3.75- 3.85
Zinc	
New York	2.00- 2.25
Cleveland	2.50- 2.75
St. Louis	2.75- 3.00
Aluminum	
Borings, Cleveland	8.50- 9.00
Mixed, cast, Cleve.	13.25-13.50
Mixed, cast, St. L.	13.00-13.50
Clips, soft, Cleve.	14.75-15.00
SECONDARY METALS	
Brass ingot, 85-5-5-5	9.25
Stand. No. 12 alum.	17.00-17.50

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	8.50- 9.50
Boston, dock, expt.	9.25- 9.50
Boston, domestic	7.50- 7.75
Buffalo, No. 1	11.50-12.00
Buffalo, No. 2	10.00-10.50
Chicago, No. 1	12.25-12.75
Cleveland, No. 1	12.00-12.50
Cleveland, No. 2	11.00-11.50
Detroit, No. 1	9.50-10.00
Detroit, No. 2	8.00- 8.50
Eastern Pa., No. 1	12.00
Eastern Pa., No. 2	11.00
Federal, Ill.	9.25- 9.75
Granite City, R. R.	10.50-11.00
Granite City, No. 2	8.75- 9.25
N. Y., deal. No. 2	7.50- 7.75
N. Y., deal. barge	8.50- 8.75
Pitts., No. 1 (R. R.)	14.50-15.00
Pitts., No. 1 (dlr.)	13.00-13.50
Pittsburgh, No. 2	11.75-12.25
St. Louis	8.50- 9.00
Valleys, No. 1	13.50-14.00

COMPRESSED SHEETS

Buffalo, dealers	10.00-10.50
Chicago, factory	11.50-12.00
Chicago, dealer	10.25-10.75
Cleveland	11.50-12.00
Detroit	10.00-10.50
E. Pa., new mat.	11.50-12.00
Pittsburgh	13.00-13.50
St. Louis	6.25- 6.75
Valleys	12.75-13.00

BUNDLED SHEETS

Buffalo	8.00- 8.50
Cincinnati, del.	7.50- 8.00
Cleveland	9.50-10.00
Pittsburgh	11.50-12.00
St. Louis	4.50- 5.00

SHEET CLIPPINGS, LOOSE

Chicago	8.00- 8.50
Cincinnati	7.00- 7.50
Detroit	5.00- 5.50
St. Louis	4.75- 5.25

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Buffalo	14.50-15.00
Chicago (3 ft.)	14.00-14.50
Chicago (2 ft.)	15.00-15.50
Cincinnati, del.	13.50-14.00
Detroit	12.50-13.00
Pitts., open-hearth, 3 ft. and less	15.00-15.50
St. Louis, 2 ft. & less	13.25-13.75

STEEL RAILS, SCRAP

Boston	7.50- 7.75
Chicago	12.25-12.75
Pittsburgh	13.75-14.25
St. Louis	11.50-12.00
Buffalo	11.50-12.00

STOVE PLATE

Birmingham	7.00- 7.50
Boston, dealers	3.50- 3.75
Buffalo	10.25-10.75
Chicago	8.00- 8.50
Cincinnati, dealers	7.00- 7.50
Detroit, net	7.00- 7.50
Eastern Pa.	9.50
N. Y., deal. fdry.	6.00
St. Louis	8.00- 8.50

COUPLERS, SPRINGS

Buffalo	14.50-15.00
Chicago, springs	13.50-14.00
Eastern Pa.	14.50-15.00
Pittsburgh	15.00-15.50
St. Louis	12.00-12.50

ANGLE BARS—STEEL

Chicago	13.00-13.50
St. Louis	12.00-12.50

RAILROAD SPECIALTIES

Chicago	13.00-13.50

LOW PHOSPHORUS

Buffalo, billet and bloom crops	14.50-15.00
Cleveland, billet, bloom crops	15.00-15.50
Eastern Pa., crops	15.50-16.00
Pittsburgh, billet, bloom crops	16.00-16.50
Pittsburgh, sheet bar crops	14.75-15.25

FROGS, SWITCHES

Chicago	12.25-12.75
St. Louis, cut	11.50-12.00

SHOVELING STEEL

Chicago	12.25-12.75
Federal, Ill.	9.25- 9.50
Granite City, Ill.	8.75- 9.25

RAILROAD WROUGHT

Birmingham	8.00- 8.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	10.00-10.50
Buffalo, No. 2	11.50-12.00
Chicago, No. 1, net	9.50-10.00
Chicago, No. 2	12.25-12.75
Cincinnati, No. 2	9.50-10.00
Eastern Pa.	12.00-12.50
N. Y., No. 1, deal.	9.50-10.00
St. Louis, No. 1	6.75- 7.20
St. Louis, No. 2	10.25-10.75

SPECIFICATION PIPE

Boston	3.00- 3.25
Eastern Pa.	10.00-11.00
New York, dealers	3.50- 4.00

BUSHELING

Buffalo, No. 1	10.00-10.50
Chicago, No. 1	11.00-11.50
Cinci., No. 1, deal.	7.50- 8.00
Cincinnati, No. 2	4.00- 4.50
Cleveland, No. 2	8.00- 8.50
Detroit, No. 1, new	8.50- 9.00
Valleys, new, No. 1	12.50-12.75

MACHINE TURNINGS

Birmingham	3.50- 4.00
Boston, dealers	3.25- 3.50
Buffalo	5.75- 6.25
Chicago	6.50- 7.00
Cincinnati, dealers	5.50- 6.00
Cleveland	7.75- 8.25
Detroit	5.25- 5.75
Eastern Pa.	7.50- 8.00
New York, dealers	3.75- 4.00
Pittsburgh	9.50-10.00
St. Louis	2.25- 2.75
Valleys	9.00- 9.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	2.50- 2.75
Buffalo	7.75- 8.25
Cincinnati, dealers	5.00- 5.50
Cleveland	8.00- 8.50
Detroit	5.50- 6.00
Eastern Pa.	6.00- 6.25
New York, dealers	1.50- 1.75
Pittsburgh	8.00- 9.00

CAST IRON BORINGS

Birmingham, plain	3.50- 4.00
Boston, chemical	5.50- 6.50
Boston, dealers	3.25- 3.50
Buffalo	7.75- 8.25
Chicago	6.00- 6.50
Cincinnati, dealers	5.00- 5.50
Cleveland	8.00- 8.50
Detroit	5.50- 6.00
E. Pa., chemical	10.00-12.00
New York, dealers	1.50- 1.75
St. Louis	3.00- 3.50

PIPE AND FLUES

Cincinnati, dealers	6.50- 7.00

RAILROAD GRATE BARS

Buffalo	8.50- 9.00
Chicago, net	7.50- 8.00
Cincinnati	5.50- 6.00
Eastern Pa.	9.00- 9.50
New York, dealers	5.00- 5.25
St. Louis	4.50- 5.00

FORGE FLASHINGS

Boston, dealers	5.75- 6.00
Buffalo	10.50-11.00
Cleveland	10.00-10.50
Detroit	8.00- 8.50
Pittsburgh	11.50-12.00

FORGE SCRAP

Boston, dealers	4.50- 5.00
Chicago, heavy	13.50-14.00
Eastern Pa.	11.50-12.00

ARCH BARS, TRANSOMS

St. Louis	12.00-12.50

AXLE TURNINGS

Boston, dealers	3.75- 4.25
Buffalo	10.50-11.00
Chicago, elec. fur.	12.00-12.50
Eastern Pa.	11.00
St. Louis	7.75- 8.25

STEEL CAR AXLES

Birmingham	12.00-12.50
Boston, ship. point.	10.50-11.00
Buffalo	14.50-15.00
Chicago, net	14.50-15.00
Eastern Pa.	17.00
St. Louis	12.50-13.00

SHAFTING

Boston, ship point.	13.00-13.25
Eastern Pa.	18.50
New York, dealers	13.50-14.00
St. Louis	11.00-11.50

CAR WHEELS

Birmingham	9.00-10.00
Boston, iron deal.	6.00- 6.25
Buffalo, iron	11.00-11.50
Buffalo, steel	14.50-15.00
Chicago, iron	12.50-13.00
Chicago, rolled steel	13.00-13.50
Cincinnati, iron	10.00-10.50
Eastern Pa., iron	12.50-13.00
Eastern Pa., steel	14.50-15.00
Pittsburgh, iron	13.50-14.00
Pittsburgh, steel	15.00-15.50
St. Louis, iron	10.00-10.50
St. Louis, steel	12.00-12.50

NO. 1 CAST SCRAP

Birmingham	9.00- 9.50
Boston, No. 1 mach.	9.00- 9.25
Boston, No. 2	8.00- 8.25
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	12.25-12.75
Buffalo, mach.	13.00-13.50
Chicago, agri. net	9.50-10.00
Chicago, auto	10.50-11.00
Chicago, mach. net	11.50-12.00
Chicago, railr'd net	10.00-10.50
Cinci., mach. cup.	10.00-10.50
Cleveland, cupola	12.25-12.75
Detroit, net	10.00-10.50
Eastern Pa., cupola	12.50-13.00
E. Pa., mixed yard	10.50
Pittsburgh, cupola	13.75-14.25
San Francisco, del.	13.50-14.00
Seattle	7.50- 9.00
St. Louis, No. 1	9.50-10.00
St. L., No. 1 mach.	11.75-12.25

HEAVY CAST

Boston, del.	6.00- 6.25
Buffalo, break.	10.50-11.00
Cleveland, break	10.00
Detroit, No. 1, mach. net	12.00-12.50
Detroit, break.	8.50- 9.00
Detroit, auto net	11.50-12.00
Eastern Pa.	11.50
N. Y., break. deal.	7.25- 7.75
Pittsburgh	12.75-13.25

MALLEABLE

Birmingham, R. R.	10.50-11.00
Boston, consum.	13.50-14.50
Buffalo	14.50-15.00
Chicago, R. R.	14.50-15.00
Cincinnati, agri. del.	11.00-11.50
Cleveland, rail	15.50-16.00
Detroit, auto net	12.50-13.00
St. Louis, R. R.	13.00-13.50
Eastern Pa., R. R.	13.00-13.50

RAILS FOR ROLLING

5 feet and over

Birmingham	11.50-12.00
Boston, dealers	8.00- 8.50
Buffalo	12.00-12.50
Chicago	13.75-14.25
Eastern Pa.	13.00-14.00
New York, dealers	10.50-11.00
St. Louis	12.25-12.75

LOCOMOTIVE TIRES

Chicago (cut)	13.50-14.00
St. Louis, No. 1	11.75-12.25

LOW PHOS. PUNCHINGS

Buffalo	14.50-15.00
Chicago	14.50-15.00
Eastern Pa.	15.00-16.00
Pittsburgh (heavy)	15.00-15.50
Pittsburgh (light)	14.00-14.50

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.50
No. Afr. low phos.	10.50
Swedish basic, 65%	9.50
Swedish low phos.	10.50
Spanish No. Africa basic, 50 to 60%	10.50
Tungsten, spot sh. ton unit, duty pd.	$15.50-16.00
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	19.25

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-60%	nominal
Indian, 48-50%	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS

Baltimore*	3.00c
Boston††	3.00c
Buffalo	3.00c
Chattanooga	3.31c
Chicago (j)	3.00c
Cincinnati	3.22c
Cleveland	3.00c
Detroit	3.09c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.06c
New Orleans	3.30c
New York‡(d)	3.31c
Pitts. (h)	2.95c-3.10c
Philadelphia*	3.03c
Portland	3.70c
San Francisco	3.50c
Seattle	3.70c
St. Louis	3.25c
St. Paul	3.25c-3.40c
Tulsa	3.25c

IRON BARS

Portland	3.40c
Chattanooga	3.31c
Baltimore*	3.05c
Chicago	2.75c
Cincinnati	3.22c
New York‡(d)	3.36c
Philadelphia*	2.93c
St. Louis	3.20c
Tulsa	3.25c

REINFORCING BARS

Buffalo	2.60c
Chattanooga	3.31c
Chicago	2.10c-2.60c
Cleveland (c)	2.10c
Cincinnati	3.25c
Houston	3.25c
Los Ang., el.	2.45c
New Orleans	3.50c
Pitts., plain (h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	2.45c
St. Louis	3.25c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES

Baltimore*	3.00c
Boston††	3.19c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland	3.31c
Detroit	3.42c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York (d)	3.46c
Philadelphia*	2.98c
Pittsburgh(h)	3.15c
Portland (i)	3.70c
San Francisco	3.50c
Seattle (i)	3.70c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.50c

PLATES

Baltimore*	3.00c
Boston††	3.21c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland, ¼-in. and over	3.31c
Detroit	3.42c
Detroit, 5/16-in.	3.65c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York (d)	3.40c
Philadelphia*	2.98c
Phila. floor	4.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.50c
Seattle	3.55c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.50c

NO. 10 BLUE

Baltimore*	3.10c
Boston††	3.30c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.05c
Cincinnati	3.22c
Cleveland	3.11c
Det., 8-10 ga.	3.14c
Houston	3.35c
Los Angeles	3.70c
Milwaukee	3.16c
New Orleans	3.55c
New York	3.31c
Portland	3.75c
Philadelphia*	3.08c
Pittsburgh(h)	2.95c
San Francisco	3.60c
Seattle	3.75c
St. Louis	3.45c
St. Paul	3.30c
Tulsa	3.70c

NO. 24 BLACK

Baltimore*†	3.60c
Boston (g)	2.95c
Buffalo	3.25c
Chattanooga	4.21c
Chicago	3.85c
Cincinnati	4.02c
Cleveland	3.91c
Detroit	3.94c
Los Angeles	4.35c
Milwaukee	3.96c
New Orleans	4.50c
New York	3.89c
Philadelphia*†	3.60c
Pitts.** (h)	3.55c
Portland	4.40c
San Francisco	4.25c
Seattle	4.40c
St. Louis	4.10c
St. Paul	3.90c
Tulsa	4.75c

NO. 24 GALV. SHEETS

Baltimore*†	4.30c
Buffalo	4.00c
Boston (g)	4.65c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.72c
Cleveland	4.61c
Detroit	4.72c
Houston	4.40c
Los Angeles	4.95c
Milwaukee	4.66c
New Orleans	4.95c
New York	4.50c
Philadelphia*†	4.40c
Pitts.** (h)	4.15-4.45c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.65c
St. Paul	4.50c
Tulsa	5.10c

BANDS

Baltimore*	3.20c
Boston††	3.30c
Buffalo	3.42c
Chattanooga	3.61c
Chicago	3.30c
Cincinnati	3.47c
Cleveland	3.36c
Detroit, 3/8-in. and lighter	3.39c
Houston	3.25c
Los Angeles	4.10c
Milwaukee	3.41c
New Orleans	3.95c
New York (d)	3.56c
Philadelphia	3.18c
Pittsburgh (h)	3.20c
Portland	4.25c
San Francisco	4.10c
Seattle	4.25c
St. Louis	3.55c
St. Paul	3.55c
Tulsa	3.45c

HOOPS

Baltimore	2.30c
Boston	4.30c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.47c
Det., No. 14 and lighter	3.39c
Los Angeles	5.85c
Milwaukee	3.41c
New York	3.56c
Philadelphia	3.43c
Pittsburgh (h)	3.70c
Portland	5.60c
San Francisco	6.15c
Seattle	5.60c
St. Louis	3.55c
St. Paul	3.55c

COLD FIN. STEEL

Baltimore (c)	3.58c
Boston	3.75c
Buffalo (h)	3.40c
Chattanooga*	3.98c
Chicago (h)	3.35c
Cincinnati	3.57c
Cleveland (h)	3.35c
Detroit	3.49c
Los Ang. (f) (d)	5.85c
Milwaukee	3.46c
New Orleans	4.15c
New York	3.81c
Philadelphia	3.61c
Pittsburgh	3.20c
Portland (f) (d)	6.00c
San Fran.(f) (d)	5.80c
Seattle (f) (d)	6.00c
St. Louis	3.60c
St. Paul	3.87c
Tulsa	4.50c

COLD ROLLED STRIP

Boston, 0.100-in., 500 lb. lots	3.245c
Buffalo	3.39c
Chicago	3.27c
Cincinnati (b)	3.22c
Cleveland (b)	3.20c
Detroit	3.33c
New York	3.36c
St. Louis	3.45c

TOOLS STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up)

	Base
High speed	57c
High carbon, high chrome	37c
Oil hardening	22c
Special tool	20c
Extra tool	17c
Regular tool	14c

Uniform extras apply.

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	70
Cleveland	70
Detroit	70-10
Milwaukee	70
Pittsburgh	70

(a) Under 100 pounds, 65 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Minus quant. diff.; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (i) Under 3 inches; (j) shapes other than rounds, flats, fillet angles, 3.15c.

‡Domestic bars; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; ‡New extras apply; ††Base 40,000 lbs., extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs. and over, 35 cts. under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Oct. 31

Export Prices f. o. b. Ship at Port of Dispatch—(By Cable or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$15 38	$14 17	1 15 0
Basic bessemer	15 38	12 95	1 12 0
Hematite, Phos. .03-.05	15 99		
SEMIFINISHED STEEL			
Billets	$27 06	$19 02	2 7 0
Wire rods, No .5 gage	41 82	36 44	4 10 0
FINISHED STEEL			
Standard rails	$40 59	$44 53	5 10 0
Merchant bars	1 65c	1 15c to 1 20c	3 2 6 to 3 3 0
Structural shapes	1 62c	1 14c	3 1 6
Plates, †¼ in. or 5 mm.	1 76c	1 56c	4 5 0
Sheets, black, 24 gage or 0.5 mm.	2 09c	2 13c	5 16 0††
Sheets, gal., 24 gage, corr.	2 53c	2 28c	6 5 0
Bands and strips	1 87c	1 46c	4 0 0
Plain wire, base	2 04c	1 96c	5 7 6
Galvanized wire, base	2 36c	2 23c to 2 33c	6 5 6 to 6 7 6
Wire nails, base	2 64c	2 11c	5 15 0
Tin plate, box 108 lbs.	$4 61		0 18 9

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d	French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$16 61	5 7 6(a)	$17 10	260	$12 46	370	$25 34	63
Basic bessemer pig iron	17 22	5 10 0(a)	12 54	190	11 12	330	27 96 (b)	69 50
Furnace coke	4 18	0 17 0	6 27	95	3 88	115	7 64	19
Billets	27 06	5 10 0	28 38	430	18 20	540	38 82	96 50
Standard rails	1 82c	8 5 0	2 08c	694	1 65c	1,100	2 42c	152
Merchant bars	1 89c	8 12 0	1 68c	560	980	2 01c	110
Structural shapes	1 93c	8 15 0	1 65c	550	900	1 97c	107 50
Plates, †¼-in. or 5 mm.	1 99c	9 1 5	2 10c	700	1 05c	700	2 52c	127
Sheets, black	2 48c	11 5 0‡	1 80c	600‡	1 24c	825‡	2 64c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2 92c	13 5 0	3 25c	1,075	2 25c	1,500	6 77c	370
Plain wire	2 04c	9 5 0	3 15c	1,050	1 73c	1,150	3 17c	173
Bands and strips	2 06c	9 7 0	1 95c	650	1 20c	840	2 52c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. a del. Middlesbrough. b hematite. ††Close annealed.

**Gold pound sterling carries a premium of 66.25 per cent over paper sterling.

Bars

Bar Prices, Page 106

Pittsburgh—An advance in rerolling billets, which is understood to be imminent, will mean a mark-up in strip and carbon steel bars. Until such a move is taken, however, steel bars remain 1.85c, Pittsburgh, and alloy bars are 2.45c, base, Pittsburgh. A heavier volume of bar orders is traceable to automotive demand.

Cleveland—Steel bar specifications from automobile manufacturers and forge shops show further improvement. Activity in other important consuming industries appears to be diminishing, except for a moderate increase in orders for railroad car repairs. New York Central has increased operations at its Collinwood, O., shops from 5 to 6 days a week. Steelmakers estimate that with carloadings averaging 750,000 weekly for three weeks an acute car shortage would be disclosed, leading to further repair work. Actual loadings in recent weeks have ranged from 700,000 to 740,000.

Chicago—Sales and specifications generally are steady though automotive requirements are improving gradually. Heavier shipments for motor car use are expected after the New York show. Tractor manufacturers show no lessening in operations, but road machinery builders shortly are expected to be less active. Miscellaneous users are buying steadily. While inventories of the latter are not excessive, some liquidation is looked for between now and the end of the year. Prospects for better demand from railroads for equipment building are more favorable.

Boston—Bar shipments against contracts and new buying are steady, the latter being mostly small lots for immediate shipment. A good miscellaneous demand prevails, with forging and alloy bars moving at the recently improved rate. While contracting was rather widespread at the start of the quarter, spot buying holds up well. Bids close Nov. 5 on 137 tons of nickel-steel bars for the Boston navy yard for chainmaking.

New York—Shipments of steel bars are well sustained although sharp competition is still felt from imported material. Foreign flat bars have sold here recently as low as 1.85c, delivered consuming plant.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 107

Orders from automobile manufacturers constitute about 50 per cent of current business at Cleveland and are tending to increase. Railroads are issuing inquiries for moderate lots of bolts and nuts. Manufacturers of cap screws are endeavoring to stabilize prices.

Specifications are fairly steady in the Chicago district, with railroads taking little and implement manufacturers buying less than recently.

Bolts and nuts are steady at 75 off list and large rivets 2.90c, Pittsburgh and Cleveland, 3.00c, Chicago.

Bolt and nut makers in the New York area find October shipments the best in many months with prices most stable at any time this year.

Plates

Plate Prices, Page 106

Pittsburgh—Ingalls Iron Works, Birmingham, Ala., is low at $75,800 on a welded basis and Dravo Contracting Co., Neville Island, Pittsburgh, at $89,400 is low on a riveted basis for the construction of four dump scows requiring 600 tons of steel plates and shapes for the federal engineers at Pittsburgh. Scows are to be 100 x 26 x 6½ feet. Other bids were as follows: American

"A.W."
SUPER-
DIAMOND
for Permanence and Economy
"Battle decks" for Bridges—the daily grind and pound of traffic can proceed promptly, safely and "permanently" over "AW" Super-Diamond Floor Plates.
More and more engineers are realizing the value of this floor plate on new construction (and the replacement of old decks) because it saves wear and tear—and taxes.
Also made in the reliable Standard Diamond and Diamondette patterns in ferrous or non-ferrous metals.
SLIP-PROOF • OIL-PROOF
HEAT-PROOF • CRACK-PROOF • SAFE • SIGHTLY
SELF-DRAINING
SPLINTERLESS
ALAN WOOD STEEL CO.
ESTABLISHED
A.W.
TRADE MARK
1826
CONSHOHOCKEN, PA.
109 Years' Iron and Steel Making Experience
ALAN WOOD
STEEL COMPANY
CONSHOHOCKEN, PA.
Branch Offices: Philadelphia • New York • Seattle
Los Angeles • San Francisco • Memphis • Boston

Bridge Co., Pittsburgh, riveted only, $110,488; Charles Hegewald Co., Jeffersonville, Ind., riveted only, $104,396; McClintic-Marshall Corp., Bethlehem, Pa., welded, $93,320; Treadwell Construction Co., Midland, Pa., riveted only, $91,600; and Alabama Dry Docks, Mobile Ala., welded only, $83,620.

Treadwell Construction Co., Midland, Pa., is low at $66,000 for the construction of two 15-ton whirler derrick boats on recent bids to the Huntington, W. Va., army engineers' office. Marietta Mfg. Co., Point Pleasant, W. Va., is low on the construction of a self-propelled 20-inch dredge for the federal engineers at Louisville, Ky., at $613,200. This job requires 550 tons of plates, of which 200 tons are wrought iron. Private barge inquiries are now being circulated for an aggregate of 40 to 45 barges, requiring 7500 to 8000 tons of plates. A large proportion of these promises to be closed before the end of the year.

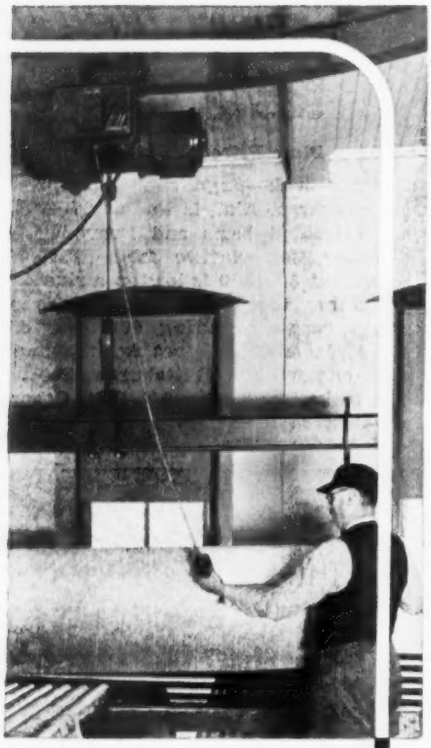
Cleveland — Manufacturers of small tanks, especially glass-lined equipment, and boilers, are fairly active and place orders regularly, but demand from other fabricators is quiet. Carlot purchases are scarce. Prices are steady.

Chicago—Plates continue slow and little improvement is in prospect until railroad equipment building and structural work expand. Signs of better activity in both directions are appearing, but in the meantime plate orders are coming principally from miscellaneous sources and in relatively small volume from structural fabricators. Pipe line production and new inquiries are light.

Boston—A well sustained demand for plates in small lots for miscellaneous requirements is strengthened by heavier tank needs, slightly more work for boiler shops and heavy tonnage for navy ships being built in New England, bids being in on part of the material for navy yards. New tonnage placed for tanks totals slightly more than 300 tons, including 160 tons for a molasses tank, Everett, Mass. A gas holder, reported placed at Meriden, Conn., takes several hundred tons.

New York—More plate tonnage is being figured, with larger requirements pending from oil companies and better demand in sight from railroads. The Pennsylvania has resumed operations at three eastern shops for repair of 1500 freight cars. Substantial needs for foreign equipment are also pending.

Philadelphia—An eastern Pennsylvania plate mill appears low on 5000 to 6000 tons of navy work, covering various schedules on which bids were recently opened. Base prices were adhered to but apparently there was some reduction, due principally to a



LITTLE DROPS
would cost
BIG MONEY here!
——— that's why
P&H HOISTS ARE USED

The paper used for currency and bank notes is expensive rag stock—it must be protected against damage from oil. That's why this New England manufacturer installed P&H Hoists. They're *drip-proof!*

It's only one feature of P&H's advanced line of hoists to give you safer, faster, more economical handling.

If you would cut down your costs, look to the newest, improved equipment. We have cases where P&H Hoists have reduced costs more than 65%. Think what that means in your overhead . . . in building a better product at a lower price.

P&H hoist engineers meet each material handling problem in the most practical and economical way. Ask one to study your requirements. If he can't save you money, he'll frankly tell you so. Write for a copy of Bulletin RH-2.

HARNISCHFEGER CORPORATION
4411 W. NATIONAL AVE., MILWAUKEE, WIS.

P&H MILWAUKEE ELECTRIC HOISTS

Who said ———
"TIME OUT"?
——— not these sturdy
P & H CONVERTIBLE MOTORS

When we designed these new P&H Convertible Motors, we compared every advantage and disadvantage of existing types. We put hard drawn copper rotor bars in straight semi-enclosed slots; we electrically brazed them to the end ring to make them indestructible; we put both sleeve and ball bearings in capsule mountings to seal them against dirt and dust for trouble-free service.

Then, we made these motors *convertible.* Standard interchangeable parts allow you to convert any of these P&H motors for open type, enclosed fan cooled, splash proof or totally enclosed applications. And this extra feature which protects you against costly replacements doesn't cost you a penny more.

Standard squirrel cage types are furnished for two and three phase, 110 to 2200 volt service with all standard frequencies—½ to 125 HP. Write for your copy of Bulletin HM-1.

HARNISCHFEGER CORPORATION
4411 W. NATIONAL AVE., MILWAUKEE, WIS.

P&H CONVERTIBLE MOTORS

freight adjustment. Chicago Bridge & Iron Works, Chicago, through its offices here, has booked a 1,000,000-gallon elevated tank for Newport News water works commission, Newport News, Va., for erection at Phoebus, Va., requiring several hundred tons. The recently announced car program of the Pennsylvania railroad is expected to result in definite inquiries soon. While no reference was made to locomotives, it is understood that the construction of 100 is under contemplation.

San Francisco—Plate awards were the largest in over two months and aggregated 1980 tons, bringing the total for the year to 42,700 tons, compared with 56,774 tons for the corresponding period in 1934. Thompson Mfg. Co., Denver, was awarded 900 tons for five siphons for a water improvement project at Denver. Western Pipe & Steel Co. is low on a pipe line for the metropolitan water district, Los Angeles, involving over 10,600 tons. Alternate bids were taken on reinforced concrete pipe, precast and cast-in-place. The district has not yet decided on what type of pipe to purchase. Los Angeles has taken bids on 175 tons of 14-inch 12 gage welded steel pipe, specification 1824.

Seattle — Tacoma awarded contracts this week for the second unit of the Green river gravity system extension. Steel Tank & Pipe Co., Portland, Oreg., will fabricate the steel sections, involving 1250 tons, on its bid of $195,838. Two sections went concrete to the American Concrete Pipe Co., Tacoma, Wash., at $102,723. This pipe will be wire reinforced. Camas, Wash., has awarded to Beall Pipe & Tank Co., Portland, Oreg., 1700 feet of 14-inch water pipe at $1.37 a foot. Jobs involving small tonnages of plates are numerous but no other projects of importance are up for immediate action.

Bids will be received Nov. 25 at Casper, Wyo. by the bureau of reclamation for furnishing and installing 415,000 pounds of steel liner plates and 390,000 pounds of steel tunnel supports. The material is for the Casper-Alcova project, Wyoming.

Contracts Placed

1250 tons, extension to Tacoma's Green river gravity water system, to Steel Tank & Pipe Co., Portland, Oreg.

900 tons, five siphons for water improvement system, Denver, to Thompson Mfg. Co., Denver.

225 tons, two 200,000-gallon elevated steel water tanks, Daytona Beach, Fla., to R. D. Cole Mfg. Co., Newnan, Ga., bids Oct. 11.

165 tons, brewing tanks, Lieber Brewing Corp., Indianapolis, Ind., to Western Gas Construction Co., Fort Wayne, Ind.

160 tons, molasses tank, Lummus Co., Everett, Mass., to Chicago Bridge & Iron Works, Chicago.

100 tons, standpipe, 60 x 25 feet, Bar Harbor Water Co., Bangor, Me., to Chicago Bridge & Iron Works, Chicago.

Unstated tonnage, 100,000-gallon elevated steel water tank, Angier, N. C., to Chicago Bridge & Iron Works, Chicago, bids Oct. 11.

Contracts Pending

10,620 tons, welded pipe, specification 115, metropolitan water district, Los Angeles; Western Pipe & Steel Co., Los Angeles, low.

1000 tons, two 118,000-barrel tanks for Sun Oil Co., at Nederland, Tex., to Chicago Bridge & Iron Works, Chicago. Noted in STEEL, Oct. 14.

600 tons, four 100 x 26 x 6¼-foot steel dump scows, for Pittsburgh army engineers, bids opened Oct. 26; Dravo Contracting Co., Neville Island, Pittsburgh, low at $89,400 on a riveted basis, and Ingalls Iron Works, Birmingham, Ala., low at $75,800 on a welded basis.

550 tons, mostly wrought iron plates, constructing and delivering United States self-propelled 20-inch dredge JEWETT, army engineer office, Louisville, Ky.; Marietta Mfg. Co., Point Pleasant, W. Va., low at $613,200 for 265 days delivery, and evaluated bid, $623,200; Oct. 24 opening.

450 tons, surge tank, North Platte, Nebr.

175 tons, 14-inch welded steel pipe,

TITAN

Pressure Castings ★

Titan brass pressure die castings possess certain very definite points of superiority that fit *them* for service in places where metal formed by any other method, or combination of methods, can no longer be economically used.

Titan pressure die castings have a better finish. They have sharper outlines and greater dimensional accuracy than sand castings. Inherently small grained, they possess a remarkably strong structure.

The pressure die casting process is well adapted to the production of castings having thin sections—intricate cored parts are readily produced—and machining tools wear longer without redressing, due to the absence of sand.

If your product is one of the thousands to which Titan pressure die cast parts can be profitably introduced, it is distinctly to your advantage to learn more about Titan. By getting in touch with us, you may pave the way toward a savings on parts and an improvement of product that you have heretofore not thought possible.

You will not be obligated. Write in today.

Titan Metal Manufacturing Company

Brass and Bronze Products

Bellefonte, Pennsylvania

Los Angeles: bids opened.

125 tons, 200,000-gallon tank on steel tower and 30,000-gallon standpipe, Strasburg, Va., Nov. 12, G. G. Crawford, mayor.

Unstated tonnage, 200,000-gallon elevated steel tank, Emporia, Va., bids in.

Tin Plate

Tin Plate Prices, Page 106

Pittsburgh — Good specifications for tin plate from several leading canmakers have caused the rate of operations at tin plate mills to advance to an average of 55-60 per cent, as compared with 50 per cent two weeks ago. Last week the leading producing interest had schedules of 75 per cent and received more domestic specifications, as well as a growing volume of demand from South America and the Far East. The market continues $5.25 per base box, Pittsburgh. One canmaker recently placed approximately 60,000 base boxes of tin plate, or about 3000 tons, the material to be used for tin beer containers.

Chicago—Tin plate is quieter because of the seasonal decline in container needs for major food packs. Demand is largely for production of general line cans, with tin plate consumption well maintained in that direction. Tin plate producers doubt whether beer containers will develop into a major market for tin plate as rapidly as has been forecast by some interests.

NEVERSLIP
ATTENTION
All of the important advantages claimed in some recent Floor Plate advertisements have been inherent in "NEVERSLIP" FLOOR PLATE ever since its introduction over 35 years ago.
Ask for full details and sample of Neverslip Plate
NOTE: Diamonds are "actual size".
American Pressed Steel Co.
Commercial Trust Building
Philadelphia, Pa.

Sheets

Sheet Prices, Page 106

Pittsburgh—On certain grades of sheets, notably full finished, producers are well booked up for the balance of November, having received attractive automotive tonnage plus a growing number of orders from miscellaneous sources. Common black sheet business is brisk and sellers closed October with books about 25 to 30 per cent ahead of September insofar as specifications are concerned. Thus it seems assured that November's shipments will run considerably ahead of October. Following an advance in semifinished steel prices, it is expected common black and single pickled sheets will be raised. Common black, galvanized, and full-finished sheet production last week averaged 70 per cent of capacity, but production by jobbing mills holds at 50-55 per cent.

Cleveland—Sheet specifications are heavy, carrying mill operations here and in an adjacent lake district to capacity. Automobile manufacturers are releasing large tonnages, and demand from fabricators of enameling sheets has increased. Some producers report they are unable to accept orders for full finished sheets for shipment prior to December, although plain, hot rolled sheets are available for immediate shipment.

Chicago—Sheet demand continues active, orders and production having shown further improvement. Better requirements of the automotive industry account for most of recent gains, though demand from miscellaneous users is fairly steady. Automotive needs are expected to temper the decrease which ordinarily develops in sheet production during November and December.

Boston—Steady diversified demand for sheets continues with buying for miscellaneous industrial needs well sustained. Small tank, container and sheetmetal working shops generally are steady consumers. Special finished sheets are moving well in numerous small lots. Releases by jobbers are also holding. Prices are steady.

New York—Shipments are moving well, although new inquiry generally is less active than two weeks ago. The resale situation in galvanized

sheets still is unsettled, and this is affecting mill releases.

Philadelphia—October proved to be one of the best months of the year in point of sheet shipments, although new orders lagged somewhat as compared with September. Sheets will be the principal flat rolled product required for the Pennsylvania railroads new carbuilding and repair program, it appears. Precisely what gage sheet will be required for most of the box car construction is not known, although the Pennsylvania's last program required a large amount of No. 12 gage carbon sheets.

Budd Mfg. Co., here, now is receiving 850 tons of sheets daily as against 600 tons at this time last year. Bids were opened last week on 200 tons of pickled sheets for Pennsylvania license plates.

Detroit—A district sheet consumer which a few months ago succeeded in establishing f.o.b. mill quotations from several of its suppliers, is now actively soliciting a more widespread adoption of this pricing method. The sheet market in this district is considerably more active than a month ago.

Cincinnati—Sheet mills in this district are operating close to capacity, with backlogs developing as the result of recent heavy contracting. Shipments during October ranked with the best months of 1935. Automobile specifications continue the upward trend with several other classes of demand expanding.

St. Louis—Sheet buying continues in satisfactory volume, with specifications in the last week of October at a rate slightly above the preceding weeks of the month. Stove and implement manufacturers are relatively the largest buyers at present. Outlook for business with the petroleum industry is more promising.

Birmingham, Ala.—Mills have maintained a steady rate of operations, and shipments have been equal to production. Agricultural districts have been buying larger tonnages.

Transportation

Track Material Prices, Page 107

Program of the Pennsylvania for building 10,000 new freight cars and repairing 1000 is the largest announced by an eastern railroad in many months. It compares with the 7000 new freight cars built by the Pennsylvania in 1934 in its own shops over a period of nine months and financed by PWA funds. Specifications are still too uncertain to permit definite estimate of the tonnage involved, as types of cars have not been determined, but rolled steel requirements are estimated by the trade as likely to range from 100,000 to 130,000 tons. In addition there should be a substantial tonnage of castings, forgings, and special items.

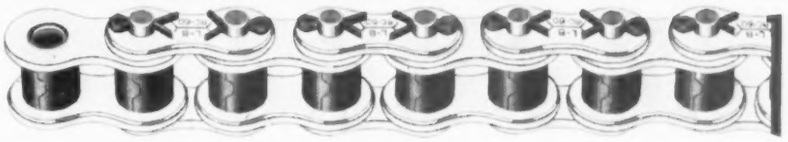
The announcement indicated that some of the cars, certainly the bodies, would be built outside the company's shops, and car builders have been asked to confer with railroad officials as to types and costs. Much, it is believed, depends upon prices quoted by the car builders as to the number of cars farmed out. Construction by the railroad itself will be at three plants in eastern Pennsylvania.

Reading Co., Reading, Pa., is building 100 fifty-ton box car bodies in its shops at Reading. Norfolk & Western plans to air-condition 25 additional passenger cars at its shops at Roanoke, Va. Canadian Pacific has placed 16 coaches of various types with the National Steel Car Co. Ltd., Hamilton, Ont. City of Seattle will receive bids Nov. 21 for leasing or purchasing 30 or more motor or trolley buses to supersede the Rainier valley trolley line.

Atchison, Topeka & Santa Fe has placed an order with Edward G. Budd Mfg. Co., Philadelphia, for a de luxe day coach of light-weight

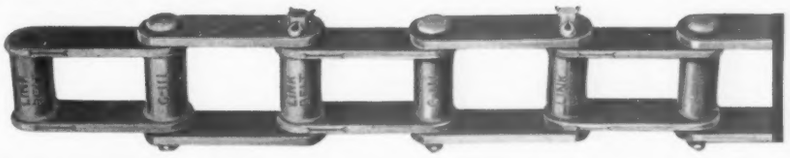
Use Genuine LINK-BELT

CHAINS AND SPROCKETS FOR

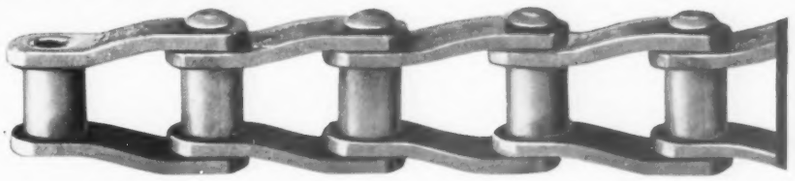


CONVEYORS AND DRIVES

IN EVERY TYPE OF



INDUSTRIAL SERVICE



PROMAL-MALLEABLE-STEEL

LINK-BELT COMPANY

The Leading Manufacturer of Equipment for Handling Materials and Transmitting Power

CHICAGO PHILADELPHIA INDIANAPOLIS ATLANTA SAN FRANCISCO TORONTO

Offices in Principal Cities

5400-E

stainless steel, of standard size, weighing only half as much as a standard steel coach. It will be air-conditioned, lighted in modern style and seat 63 passengers. It will be fabricated by the Budd shotweld process.

Northern Pacific has asked bids on 12,000 to 16,000 tons of rails for delivery early in 1936.

Car Orders Placed

Atchison, Topeka & Santa Fe, one de luxe stainless steel day coach to Edward G. Budd Mfg. Co., Philadelphia.

Canadian Pacific, 16 coaches, to National Steel Car Co. Ltd., Hamilton, Ont.; including eight 65-foot steel coaches, four combination baggage and buffet cars and four steel mail and express cars.

Reading Co., 100 automobile box car bodies, 50 tons capacity each, to own shops at Reading, Pa.

Rail Orders Pending

Northern Pacific, 12,000 to 16,000 tons, bids asked; deliveries to be made in the spring.

Car Orders Pending

Pennsylvania, 10,000 new freight cars and repairs to 1000, program officially announced; portion of work will be done in company's own shops, with remainder let outside.

Buses Booked

Reading Transportation Co., subsidiary of Reading Co., Philadelphia, has distributed orders for six tractors, 11 trucks, 12 semi-trailers and other miscellaneous equipment.

Twin Coach Corp., Kent, O.: Ten 37 and 41-passenger for East Bay Street Railway Co., Oakland, Calif.; eight 23-passenger for Columbus Railway Power & Light Co., Columbus, O.; seven 30-passenger for Baltimore Transit Co., Baltimore; five 23-passenger for Kansas City Public Service Co., Kansas City; five 31-passenger for Syracuse Railway Co-ordinated Bus Lines Inc., Syracuse, N. Y.; six 23-passenger for Duke Power Co., Charlotte, N. C.; six 31-passenger for Washington, Virginia & Maryland Coach Co., Clarendon, Va.; four 31-passenger for Trackless Transit Co., East Orange, N. J.; three 23-passenger for New York State Railways, Utica, N. Y.; two 22-passenger for Southwest Missouri Railroad Co., Joplin, Mo.; two 23-passenger for Bremerton-Charleston Transportation Co., Bremerton, Wash.; two 25-passenger for Canton Motor Coach Co., Canton, O.; two 25-passenger for Menderson Bus Lines, Phoenix, Ariz.; two 41-passenger for Los Angeles Railway Co., Los Angeles; two 41-passenger for Boston Elevated Railway, Boston; two 25-passenger for Buffalo Transit Co., Buffalo.

Behind the Scenes with STEEL

Kicker Nonplussed

THE other day the door of our New York office burst open and a "Constant Reader" leveled an accusing finger at one of the editors there, saying: "Where did you get the dope about the ——— Steel Co. taking that 500-ton reinforcing bar award?"

The editor, a kindly soul, inquired gently whether or not the report was correct. The accuser cussed and admitted it was. He had lost the contract, it seems; but what he wanted to know was where we got the information about the award.

Private sources of information must be protected at all costs, however, and the editor tactfully explained that he could not divulge details.

"Well," said our visitor, "I've been reading STEEL for 15 years and if you can't please an old reader, cancel my subscription."

Reminded that he himself had supplied similar information in the past, our irate guest was asked whether he would have liked these confidences violated. No, of course he wouldn't, was the reply, and further, "Better keep sending STEEL along, after all."

The door slammed, the stenographers resumed their gum chewing and the editor knocked out five more commas from a manuscript he was scanning. All in the day's work.

* * *

Can You Use Us?

A REPRESENTATIVE of an Australian manufacturer, traveling in this country, has made STEEL *his headquarters, receiving cables, letters and other advices from his secretary in the home office in the kangaroo country.*

We have ample facilities at 1213 West Third street, Cleveland, to render special services of this kind. We'll be glad to oblige you upon any occasion.

* * *

Erratum

SOMEWHERE in that great, sparsely populated Valhalla of departed publishers and their cohorts is a comfortable nook for those heroes whose records conclude with the terse phrase "No errors." Years hence you will *not* find this scrivener there.

Last week in this department we gave the opening date of the International Acetylene association meeting in Cleveland as Nov. 18. It's not. Nov. 12-15 are the correct days. Excuse it, please.

Incidentally, in case you haven't already noticed it, this week's issue, pp. 67-98, gives you a complete picture of next week's meeting and an authoritative review of the year's developments in oxyacetylene welding and cutting. A flock of advertisers seize the opportunity to get in their good words, too.

* * *

Washingtones

AS A NEAT turner of phrases, the doughty Gen. Johnson has no than-whomer, in our estimation. His latest SEPrattlings concerning machinations of the Happy Hot Dog Boys in Washington are both amusing and informative.

Washington will continue to be a hotbed of gossip and happenings, especially with the Great American Peepul going to the polls next year to vindicate or abdicate the present administration. As the picture affects the industrial situation, we suggest you keep it in sight through STEEL's Windows of Washington.

* * *

Barnard Beckons

WE NEVER knew any of the Barnard College girls but, from recent front-page information, it's our own hard luck. Over 50 per cent indulge in that pastime known as necking; 26 per cent practice the "soul

kiss"; 44 per cent—but why go on? After all, this is a business paper; there must be some restrictions. Three cheers and a tiger for the Barnard daisy chain, or whatever they have down there.

* * *

Up Again

VOLUME of advertising in STEEL for September increased over 47 per cent from the same month in 1934. The latter, in turn, was 64 per cent ahead of that month in 1933. As Winchell might say, it's little figures like these that make big paragraphs like these.

—SHRDLU

Pipe

Pipe Prices, Page 107

Pittsburgh — Slightly heavier buying of oil country goods is reported, but orders still are running to small size individually and most buyers are not stocking. Fair demand for standard pipe, boiler tubes, and mechanical tubing continues, and the average of all tubular mill operations is unchanged at around 50 per cent. Although pipe producers state they do not contemplate any change in the existing price schedule, an advance in skelp which is being proposed would definitely be the basis for an upward adjustment in discounts on tubular products.

Chicago—Municipalities are more active in attempting to get work under way on projects financed by federal funds. Most pending jobs are WPA projects and a fairly large tonnage is involved in such work. Orders recently have been small, but improved business is looked for shortly.

Boston—Merchant steel pipe demand is steady with some sellers noting an improvement for welded pipe in small diameters. Cast iron pipe is sluggish, buying and inquiry being light. Milford, Mass., has bids on a small tonnage for a sewage treatment plant.

San Francisco—Demand for cast iron pipe has improved considerably

during the past few days and pending business now exceeds 3500 tons, a larger tonnage than has been up for figures since June.

Seattle—Cast pipe jobs are developing rapidly and several large projects will be up for figures next month. Tacoma, Wash., will open bids Nov. 6 for miscellaneous gate valves and other accessories for the Green river gravity system.

Cast Pipe Placed

1000 tons, various sizes, Fredericksburg, Tex., to United States Pipe & Foundry Co., Burlington, N. J.
200 tons, Jackson Center, O., to James B. Clow & Sons, Chicago.
131 tons, 2 to 4-inch, Torrey, Utah, to Pacific States Cast Iron Pipe Co., Provo, Utah.
120 tons, 16-inch, class 100, Seattle, to United States Pipe & Foundry Co., Burlington, N. J.
100 tons, universal and galvanized, Douglas, Alaska, to Crane Co., Seattle; Wright & Stock Inc., Seattle, general contractor.
100 tons, Sandusky, O., to James B. Clow & Sons, Chicago.

Cast Pipe Pending

990 tons, 2 to 6-inch, Escalante, Utah; bids Nov. 14.
800 tons, Corbett, Oreg.; bids to be readvertised.
575 tons, 6 and 12-inch, Amesbury, Mass.
560 tons, Beverly Hills, Calif.; bids soon.
406 tons, 24-inch, Chicago; Lynchburg Foundry Co., Lynchburg, Va., low.
350 tons, Northbridge, Mass., bids Nov. 8.
340 tons, 6 and 8-inch, Minersville, Utah; bids Nov. 18.
250 tons, mostly 6-inch, Sharptown, Md.; bids Nov. 8; also 100,000-gallon elevated steel water tank.
230 tons, 12-inch, Burlington, N. C.; bids in.
210 tons, 6 and 8-inch, Sulphur Springs, Tex.
200 tons, 10-inch, Lexington, Va.; bids Nov. 4.
197 tons, 4 and 6-inch, Galt, Calif.; bids soon.
161 tons, 12,000 feet of 4 to 6-inch and accessories, Lewiston, Idaho; bids Nov. 6.
147 tons, 4-inch class 250, Bloomington, Idaho; bids Nov. 3.
130 tons, 12-inch, Fox Point, Wis.; bids Nov. 8.
Unstated tonnage gate valves and accessories, Tacoma, Wash.; bids Nov. 6.

Cold Finished

Cold Finished Prices, Page 107

Pittsburgh—Consistent with possibility of an advance in prices on all finished steel products, an advance of at least $1 per ton on cold-finished steel bars is expected to be announced soon. The base on cold-finished steel bars has remained 1.95c since August. In the meantime, hot-rolled bars have been advanced from 1.80c to 1.85c and a quantity differential system put into effect. The cold-finished steel bar market is more active than a month ago.

Shapes

Structural Shape Prices, Page 106

New York—Pending structural tonnage active is heavy with some gain in contracts placed, including 3500 tons for a high school, Jamaica, N. Y. George Atwell Co., New York, is low on the west-side elevated highway project, 76 to 79th streets, New York, taking 4600 tons. Inquiry for bridges is heavier.

Fabricated structural steel declined in volume but slightly during September, according to the American Institute of Steel Construction. New orders booked were 35.7 of normal, normal being the yearly average for 1928-1931, inclusive. This was but slightly below the average bookings for the year to date. Shipments, however, declined from 52.2 per cent to 40.1 per cent of normal, the latter being 1.2 per cent above the monthly average to date.

Pittsburgh—Seeds & Durham Co., Philadelphia, is low at $877,172 for cofferdam alterations to the Emsworth dam in the Ohio river, requiring 1810 tons of steel sheet piling.

ATLAS GAS-ELECTRIC LOCOMOTIVES

45 Ton Locomotive especially suitable for economical interplant switching service.

OTHER ATLAS PRODUCTS

Gas-Electric and Diesel-Electric Locomotives . . . Electric Transfer Cars for Blast Furnaces and Steel Plants . . . Stockhouse Scale Cars for Blast Furnaces . . . Concentrate and Calcine Cars for Copper Refineries . . . Automatic and Remote Controlled Electric Cars . . . Pushers, Levellers and Door Extractors . . . Coal Charging Lorries, Coke Guides and Clay Carriers . . . Atlas Patented Coke Quenching Cars for By-Product Coke Ovens . . . Atlas Patented Indicating and Recording Scales . . . Special Cars and Electrically Operated Cars for every conceivable Purpose.

THE ATLAS CAR & MFG. CO.

Engineers . . . Manufacturers

CLEVELAND, OHIO

Unit Bids on Steel Items in 7745-Ton New York Bridge

Manhattan Approach to Triboro Project, Opening Oct. 17; All Bidders New York Contractors, Unit Prices Per Pound in Place

	Quantities in tons	Corbetta Constr. Co.	N.Y. & N.J. Engrg. Corp.	P. T. Cox Cont. Co.	J. Meltzer, Inc.	Frederick Snare Corp.	J. Leopold & Co.	Anthony Constr. Corp.	Taylor-Fichter Constr. Co.
Carbon structural steel	4,075	6.00c	5.50c	5.80c	5.40c	6.267c	5.50c	6.00c	5.70c
Silicon structural steel	1,325	7.15c	6.60c	6.60c	6.70c	6.617c	6.50c	7.10c	6.70c
Reinforcing steel	1,550	4.00c	4.25c	4.50c	5.00c	4.00c	5.00c	4.54c	5.00c
Reinforcing trusses (lin. ft.)	230,000 ft.	25.00c ft.	31.00c ft.	30.00c ft.	35.00c ft.	25.00c ft.	35.00c ft.	30.00c ft.	40.00c ft.
Miscellaneous cast iron, steel, wrought and malleable	115	17.00c	16.00c	17.00c	20.00c	10.00c	15.00c	16.75c	20.00c

Structural steel awarded American Bridge Co., Pittsburgh, as reported in STEEL, Oct. 28. Corbetta Construction Co. awarded general contract at $1,494,644.

structural steel, and various other rolled steel requirements. Delays still characterize PWA building work for the Allegheny county authority, and last week the authority refused the request of PWA officials that actual work be started on the $1,721,000 Liberty tubes toll project.

Cleveland—Small awards are fairly numerous but large tonnages are lacking. Fabricators expect substantial orders for grade separation work in northern Ohio counties, which may develop late this fall, including projects at Toledo and Ashtabula, and which may require several thousand tons.

Chicago—While structural awards continue light, inquiries have been stimulated sharply by requests for bids on several large bridges to be built with public funds. Total inquiries of nearly 13,000 tons include 11,000 tons for bridges. The largest of the latter are 3000 tons for a grade crossing elimination at Hammond, Ind., 2500 tons for the Torrence avenue bridge, Chicago, and 1750 tons for a bridge across the Illinois river at Havana. States are pushing work sponsored by WPA money since it is understood that such projects must be ready for the placing of contracts by Dec. 15.

Boston—More structural volume is coming out, led by schools, bridges, housing projects and other miscellaneous work. The total is the largest in several months. Bids close this week on a 475-ton bridge at Providence, R. I. Most district fabricating shops are slightly more active, a few having fair backlogs.

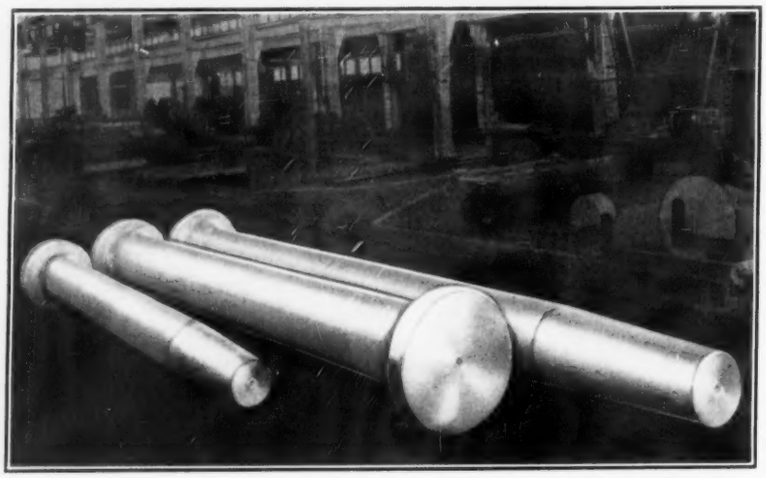
Philadelphia — Eastern Pennsylvania shape mills are more active, due largely to improvement in building outside the district. The largest recent award in this district involves 600 tons for a mill in Edge Moor, Del., this business going to Roy Robinson, Philadelphia. Seeds & Durham Co., Philadelphia, is low on the Emsworth lock and dam project on the Ohio river, involving 7000 to 8000 tons of rolled steel and including approximately 500 tons of structural shapes and plates. Bids will be opened this week on two public schools in Philadelphia, requiring a total of 500 tons of shapes, and specifications will be issued a little later on a 500-ton high school addition in Reading, Pa., and a 800-ton junior high school in Scranton, Pa.

Birmingham, Ala. — Fabricating shops are fairly active, new contracts keeping up backlogs. Bids are in on more federal projects.

San Francisco—The final structural steel contract for the Golden Gate bridge, San Francisco, 3000 tons for contract No. 5, was awarded to Judson-Pacific Co., San Francisco. More grade separation projects in the western states are coming up for figures and the total pending business exceeds 8000 tons.

Seattle—While awards are light, considerable tonnage is up for figures. The largest job, the First avenue south overpass, Seattle, bids at

QUALITY FORGINGS



Ship Tail and line Shafts

Rolled Steel Wheels — Rolled Steel Rings and Flanges
Forgings — Steel Castings — Steel Tires
Springs — Gear Blanks

STANDARD STEEL WORKS COMPANY

BURNHAM, MIFFLIN CO., PENNA.

Branch Offices

New York | Philadelphia | Portland, O. | Chicago | St. Louis | San Francisco

Shape Awards Compared

	Tons
Nov. 2	23,041
Week ended Oct. 26	10,721
Week ended Oct. 19	16,100
This week, 1934	7,250
Weekly average, 1934	16,284
Weekly average, 1935	16,204
Weekly average, October	18,957
Total to date, 1934	737,512
Total to date, 1935	729,187

Olympia Nov. 13, calls for 1580 tons, and 27 tons of galvanized hardware.

Shape Contracts Placed

3500 tons, Franklin K. Lane high school, Jamaica, New York city, to McClintic-Marshall Corp., Bethlehem, Pa.; Wilaka Construction Co., New York, general contractor.

3000 tons, contract No. 5, Golden Gate bridge, San Francisco, to Judson-Pacific Co., San Francisco.

2315 tons, Andrew Jackson high school, Springfield, Queens, New York, to Harris Structural Steel Co., New York; through George F. Driscoll Co.

1680, gates, valves and miscellaneous structural material, Pickwick dam, Tenn., Tennessee valley authority requisition 66237, to Virginia Bridge & Iron Co., Roanoke, Va.

875 tons, school No. 107, Bronx, New York, to Harris Structural Steel Co., New York; through Walter Kidde Constructors Inc.

800 tons, bridge, Konowa, Okla., to McClintic-Marshall Corp., Bethlehem, Pa.

740 tons, state highway bridge, Tyrola, Okla., to McClintic-Marshall Corp., Bethlehem, Pa.

680 tons, two 225-foot truss spans, Southern Pacific railroad, Hacienda, Tex. to Virginia Bridge & Iron Co., Roanoke, Va.

600 tons, jute mill, Ludlow Mfg. Co., Edge Moor, Del., to Roy Robinson, Philadelphia.

500 tons, apartment hotel for Harold A. Clark, Miami Beach, Fla., to Morris, Wheeler & Co., Philadelphia.

490 tons, state bridge 166-15-PWS 57, Labette county, Kansas, to Missouri Valley Bridge & Iron Co., Decatur, Ill.

460 tons, state highway bridge X1, 62-20-2, Detroit, to R. C. Mahon Co., Detroit.

375 tons, bridges, Colorado Springs, Colo., to American Bridge Co., Pittsburgh.

365 tons, state bridge FAP 171-C, Clark county, Missouri to Illinois Steel Bridge Co., Jacksonville, Ill.

330 tons, building, Upper Derby, Pa., for Philadelphia Suburban Terminal Building Co., to McClintic-Marshall Corp., Bethlehem, Pa.

300 tons, bridge, Reservoir avenue, Providence, R. I., to Boston Bridge Works Inc., Cambridge, Mass.; Frank A. Snow Co., general contractor.

300 tons, state highway bridge, Whitley, Ky., to Vincennes Bridge Co., Vincennes, Ind.

300 tons, mill building, APW Paper Co., Albany, N. Y., to James McKinney & Sons, Albany; through J. P. Sewell, with 40 tons of reinforcing bars to Strope Steel Co., Albany.

295 tons, state highway bridge X1-19-15-2, Lansing, Mich., to R. C. Mahon Co., Detroit.

285 tons, state highway bridge RC-3644, Canisteo-Jasper highway, Steuben county, New York, to Lackawanna Steel Construction Corp., Buffalo; William L. Collins, Hornell, N. Y., general contractor.

281 tons, Bijou Creek bridge, Morgan county, Colorado, for state, to unnamed interest.

275 tons, two state highway bridges, Dexter and Adams counties, New York, to McClintic-Marshall Corp., Bethlehem, Pa.

271 tons, Marias river bridge, Chouteau county, Montana for state, to unnamed interest.

250 tons, building, Niagara Falls, N. Y., for National Carbon Co., to McClintic-Marshall Corp., Bethlehem, Pa.

210 tons, state bridge NRH 8-D, Hays county, Texas, to Alamo Iron Works, San Antonio, Tex.

200 tons, walkways for tunnel penstocks, specification 640, Boulder dam, Nevada, to Reliance Steel Products Co., Rankin, Pa.

200 tons, state highway bridge, Harlan county, Kentucky to Bristol Steel & Iron Works, Bristol, Va.

200 tons, state highway bridge, Lumber City, Ga., to McClintic-Marshall Corp., Bethlehem, Pa.

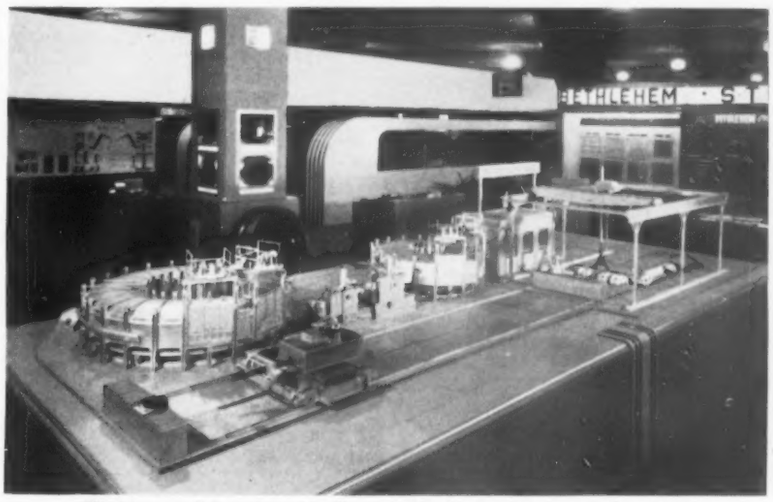
195 tons, incinerator, Providence, R. I., to New England Structural Co., Everett, Mass.; Hiler Engineering & Construction Co., Brooklyn, N. Y., general contractor.

190 tons, bridge 8-23 ERP 4, Cloud county, Kansas, to Pittsburgh-Des Moines Steel Co., Des Moines.

175 tons, building, Kings county hospital, Brooklyn, N. Y., to Weatherly Steel Co., Weatherly, Pa.; through Harry Stone Co.

175 tons, bridge, Plymouth, Mich., to American Bridge Co., Pittsburgh.

164 tons, shapes and bars, postoffice,



Working model, automatically controlled, wheel heat treating plant of the Bethlehem Steel Company's Cambria works at Johnstown, Pa. On Display at recent National Metals Exposition, Chicago.

List of Clients

Aluminum Co. of America
Westinghouse Elec. and Mfg. Co.
H. J. Heinz Co.
Jones and Laughlin Steel Corp.
U. S. Steel Corp.
Bethlehem Steel Corp.
Weston Instrument Co.
Parker-Kalon Co.
McGraw Hill Publishing Co.
Chilton Publications
Armstrong Cork Co.
Standard Sanitary Co.
Allegheny Steel Co.
Molybdenum Corp. of America
Universal Steel Co.
Pure Oil Co.
Blaw-Knox Co.
Pittsburgh Steel Co.
Gulf Refining Co.
National Cash Register Co.

OF course you have perplexing Displa y problems—every opportunity your company accepts to place its products before visitors at Convention Exhibits is a real test of display skill.

Gone are the days of loose hung drapes—

Today it's real, hard hitting display salesmanship that draws the crowds and registers new prospects by the score.

What is your Display problem? Whatever it is Gardner Display offers the services of highly skilled Designers and expert Display Consultants.

Gardner Display services range from properly designed inexpensive Convention Exhibits and Sales Promotion Displays to highly technical and precision built working models of plants and motion displays.

May we send you additional literature, fully explaining how your Display problems can be handled efficiently?

GARDNER
DISPLAYS

Offices and Factories

PITTSBURGH
323 Blvd. of the Allies
Tele. Atlantic 4370

NEW YORK CITY
215 E. 37th St.
Tele. Murrayhill 2-4934

CONVENTION EXHIBITS — ACTION DISPLAYS — PRECISION MODELS
DISPLAY ADVERTISING — (DESIGNING — BUILDING — ERECTING)

Amsterdam, N. Y., to unstated interest, Ring Construction Co., Minneapolis, general contractor.

155 tons, Southwest high school, St. Louis, to Superior Structural Steel Co., St. Louis.

135 tons, postoffice, Warren, O., to Ohio Structural Steel Co., Newton Falls, O.

130 tons, three 45-foot T. D. spans, Chicago, Milwaukee & St. Paul railroad, to Milwaukee Bridge Co., Milwaukee.

125 tons, Allegheny county (Pittsburgh) juvenile court house, to Levinson Steel Co., Pittsburgh.

125 tons, bridge 40N-23 ERP 6, Clay county, Kansas, to Illinois Steel Bridge Co., Jacksonville, Ill.

120 tons, state highway bridge RC-3612, Oneida county, New York, to McClintic-Marshall Corp., Bethlehem, Pa.

120 tons, state bridge 3228 Columbia county, Arkansas to Arkansas Foundry Co., Little Rock.

120 tons, state building, Apple Creek, O., to Burger Iron Co., Akron, O.

115 tons, mill extension, North Grosvenordale, Conn., to Haarmann Steel Co., Holyoke, Mass.; through Gross & Carlton.

110 tons, bridge, Fredonia, N. Y., to R. S. McMannus Steel Construction Co., Inc., Buffalo.

105 tons, St. Joseph's Novitiate, West Hartford, Conn., to Topper & Griggs, Hartford, Conn.; through Wise & Upson.

105 tons, state highway project No 8440, North Carolina, to Virginia Bridge & Iron Co., Roanoke, Va.

100 tons, shapes and bars, buildings, Coast Guard air station, Salem, Mass., to New England Structural Co., Everett, Mass., and Truscon Steel Co., Youngstown, O.; Koslow & Richie, Somerville, Mass., general contractors.

100 tons, incinerator, Bridgeport, Conn., to Turl Engineering Works Inc., New York; Hiler Engineering & Construction Co., Brooklyn, N. Y., general contractor.

100 tons, buildings, Superior Realty Co., South Boston, Mass., to Groisser-Shlager Iron Works, Boston, D'Amore Construction Co., Boston, general contractor. Grid Flat Slab Corp. awarded reinforcing steel.

100 tons, state bridges in Johnson and Lincoln counties, Wyoming, to unnamed interest.

100 tons, state bridge, Jackson county, Texas, to Alamo Iron Works, San Antonio, Tex.

100 tons, building, Puget Sound, Wash., navy yard, to Star Iron & Steel Works, Tacoma, Wash.

Shape Contracts Pending

4600 tons, west side elevated highway, Seventy-sixth to Seventy-ninth streets, Manhattan, New York; George Atwell Co., low on general contract.

3000 tons, overhead crossing, Hammond, Ind.; bids to state Nov. 19.

2500 tons, Torrence avenue lift bridge, Chicago, PWA project 9625-x; bids to Chicago commissioner of public works, Nov. 19.

2000 tons, addition to Archives building, Washington, withdrawn, following the recent opening of general contractors' bids, the second opening on this project.

1800 tons, steel sheet piling and structural steel, alterations to Emsworth, Pa., dam; Seeds & Durham Co., Philadelphia, low at $877,177.22 on Oct. 25 bids to federal engineer office, Pittsburgh. Other bidders: Merritt, Chapman & McLean Corp., Baltimore, $1,048,354; Dravo Contracting Co., Neville Island, Pa., $1,095,773.

1580 tons, First avenue south overpass, Seattle; bids at Olympia, Wash., Nov. 13.

1750 tons, state bridge, Havana, Ill.; bids Nov. 15.

1125 tons, piling, levee wall, Cairo, Ill.; Missouri Engineering & Contracting Co., St. Louis, awarded general contract.

1025 tons, state bridges, Nebraska.

1000 tons, theater, Stanford university, Palo Alto, Calif.; bids soon.

500 tons, state highway bridge, Cynthiana, Ky.

500 tons, high school construction, Reading, Pa., specifications expected out shortly; approximately 500 tons of bars also required.

500 tons, two schools, Philadelphia, bids Nov. 9; also 500 tons of billet steel reinforcing bars.

500 tons, state bridges, Wisconsin.

500 tons, pump house, Stickney, Ill., for Chicago sanitary district; bids Nov. 14.

500 tons, state bridges, Illinois; bids Nov. 8.

490 tons, two state highway bridges, Hand, Mich., and Flint, Mich.

475 tons, state bridge over Boston & Maine railroad, Beaver Brook and Main street, Waltham, Mass., bids Nov. 5, department of public works, Boston; two contracts, substructure and superstructure.

440 tons, also 58 tons reiinforcing bars, Crawford county, Pennsylvania, bridge, H. A. McBurney, Pittsburgh, low.

375 tons, postoffice, Waco, Tex.

375 tons, overhead crossing, Dearborn, Mich.

350 tons, flooring for state bridge in Lewisburg borough, Pennsylvania; new bids to be asked this month.

343 tons, Yellowstone river bridge near Laurel, Yellowstone county, Montana; bids opened.

300 to 400 tons, disposal plant, Niagara Falls, N. Y.; bids Nov. 15.

300 tons, bridge, Reservoir avenue, Providence, R. I.; Frank A. Snow Co., low.

275 tons, approximately, reconstructing three highway bridges over Chesapeake & Delaware canal; bids to United States engineer, Philadelphia, Nov. 18.

250 tons, plant addition, Baldwin Rubber Co., Pontiac, Mich.

250 tons, derrick, West Mineral, Kans.

250 tons, power house, Ft. Collins, Colo.

250 tons, postoffice and court house, St. Augustine, Fla.

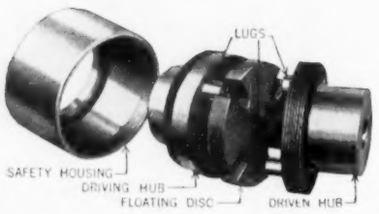
250 tons, factory building, Canton, O., for Hercules Motor Co.

233 tons, also 126 tons reinforbing bars, Beaver county, Pennsylvania, bridge; A. V. Beatty, East Liverpool, O., low.

220 tons, bridge approach, contract No. 5, Allegheny county authority, Pittsburgh.

176 tons, state crossings, Eureka and Lyon counties, Nevada; bids opened.

A New Coupling!



Saves Assembling & Mounting Costs

Note These Advantages

1. Self-aligning.
2. Perfect flexibility.
3. Balanced for high speed.
4. Highest efficiency even at maximum misalignment.
5. Angular misalignment up to 6°.
6. Parallel misalignment 1/16″ to 3/16″.
7. Runs on sprung shaft.
8. Minimum protection needed against grit, dirt or water.
9. Durable safety covers.
10. Adds astonishingly to bearing and motor life.
11. Silent at all speeds.
12. Neat and trim in appearance.

ALLOY PRODUCTS CORP.
Waukesha, Wis.

174 tons, state bridge, Garfield county, Montana; bids opened.

164 tons, state viaduct at Mossmain, Yellowstone county, Montana; bids opened.

129 tons, two state crossings, Silber Bow and Flathead counties, Montana; bids opened.

121 tons, state undercrossing Galena, Wash.; bids at Olympia, Wash., Nov. 5.

115 tons, federal building, Ketchikan, Alaska; Warrack Construction Co., Seattle, general contractor.

110 tons, Unity dam, Vale project, Oregon; bids about Dec. 1.

105 tons, postoffice, Salinas, Calif.; bids Nov. 22.

100 tons, consisting of 173,700 pounds of plain structural steel and 25,823 square feet of steel channel bridge flooring, Oliver and Wayne townships, Mifflin county, Pennsylvania; bids to state highway department, Nov. 15.

Unstated, state bridge Clearwater river, Idaho; J. F. Konen, Lewiston, Idaho, general contractor.

Unstated tonnage, four 60-foot, one 70-foot beam spans, Bridgeport, Ind.

Reinforcing

Reinforcing Bar Prices, Page 107

New York—While reinforcing steel inquiry is heavy, awards are light. Considerable highway mesh buying has been delayed. Much of this material will not be needed until spring. Building mesh requirements are slightly heavier. Close to 3000 tons of bars for sewer construction, Manhattan and Bronx, are active. Prices on the larger lots are easy.

Pittsburgh—Concrete structures in McCandless, Pine, and Jefferson townships, Allegheny county, Pennsylvania, will require 384,626 pounds of plain steel bars in a state highway letting at Harrisburg, Pa., Nov. 15. Bids on 333,525 pounds of plain steel bars for a reinforced concrete beam bridge and two reinforced cement concrete structures, Blair and Huntingdon counties, Pennsylvania, will be taken by the state highway department, Nov. 8. The market continues quoted 2.05c, base, Pittsburgh, by distributors for reinforcing bars in cut lengths, new billet quality.

Cleveland—Competition is keen for the small orders that are appearing and prices have been shaded in numerous instances. For the Pleasant valley dam, Perrysville, O., in the Muskingum, Ohio, conservancy district, 500 tons of concrete bars and 110 tons of miscellaneous steel have been awarded by a Cleveland contractor. Award of 350 tons for buildings at Cleveland's easterly sewage disposal plant is expected shortly.

Chicago — Concrete bar orders are slightly heavier, with further improvement in early prospect. Distribution of 1100 tons for Chicago sanitary district work awaits the signing of formal contracts. Low bidder for the general contract for the Milwaukee housing project involving 800 tons has been announced. Road and bridge work in this and nearby states will take a fairly substantial tonnage, with action on such construction expected to be stimulated in order that contracts may be placed by the middle of December. Among the largest of recent awards is 350 tons for the Benton Harbor, Mich. bridge.

San Francisco—The majority of reinforcing bars awards were limited to lots of less than 100 tons, the total being slightly less than 2000 tons. Unnamed interests obtained 620 tons for the barracks and mess hall at the air fleet base, Pearl Harbor, T. H. Interest centers on the pipe line for the metropolitan water district, Los Angeles, involving 18,000 to 22,000 tons, still pending.

Boston — Highway requirements are not impressive, but bridge needs are heavier, also general construction projects, mainly public works. Awards are light, with small-lot buying more active. Reinforcing bar prices, while still inclined to weakness on the larger inquiries, are generally steadier.

Seattle—Demand for reinforcing materials is improving. Several sizable projects are up for figures and others are rapidly assuming form. Warrack Construction Co., Seattle, has the general contract for the Ketchikan, Alaska, postoffice and federal building, requiring 175 tons. The state will open bids at Olympia Nov. 13 for the Nisqually river bridge, calling for 1042 tons, and the First avenue south overpass, Seattle, 6990 tons.

Concrete Awards Compared

	Tons
Nov. 2	5,522
Week ended Oct. 26	6,924
Week ended Oct. 19	10,246
This week, 1934	1,851
Weekly average, 1934	4,084
Weekly average, 1935	6,763
Weekly average, October	7,383
Total to date, 1934	201,890
Total to date, 1935	304,368

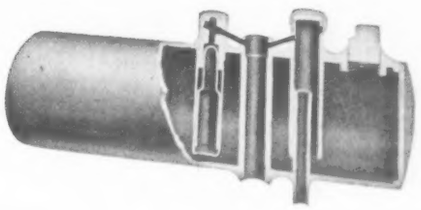
Reinforcing Steel Awards

1100 tons, reservoir, Reading, Pa., to Kalman Steel Corp., Bethlehem, Pa.

620 tons, barracks and mess hall, specification 7474, Pearl Harbor, T. H., to unnamed interest.

550 tons, state highway bridge, Jackson county, Arkansas, to Jones & Laughlin Steel Corp., Pittsburgh; F. V. Ragsdale Co., Memphis, Tenn, general contractor. Virginia Bridge

CROSBY STAMPINGS



Forty years of concentration on producing Metal Stampings, exclusively, has given us a wide experience which is available to you.

If you have never used Crosby Service, let us figure on your next stamping job.

THE CROSBY COMPANY
BUFFALO, N. Y.

Branch Offices

New York Chicago Philadelphia Detroit Cleveland

& Iron Co., Roanoke, Va., awarded 75 tons of structural steel.

500 tons, also 110 tons miscellaneous steel, Pleasant valley dam, Perrysville, O., Muskingum valley, Ohio, conservancy district project, to unstated fabricator, through Newhall Herkner Construction Co., Cleveland.

475 tons, wire fabric, for United States engineer, Vicksburg, Miss., to Copperweld Steel Co., Glassport, Pa.

357 tons, Southwest high school, St. Louis, to Laclede Steel Co. St. Louis.

350 tons, incinerator, New York, to Carroll & McCready Co. Inc., Brooklyn, N. Y.; through Rossoff Bros.

350 tons, bridge, Benton Harbor, Mich., to Calumet Steel Co., Chicago.

234 tons, Marias river bridge, Chouteau county, Montana, for state, to unnamed interest.

135 tons, postoffice, Chester, Pa., awarded through the Nicholas Engineering Co., Philadelphia, general contractor, to Sweets Steel Co., Williamsport, Pa.; rail steel.

120 tons, channels and stilling basin, Nogales, Ariz., to unnamed interest.

116 tons, hospital building, Columbia, S. C., to Virginia Steel Co., Richmond Va.; through J. J. McDevitt Co., Charlotte, N. C.

115 tons, five siphons for Denver, to unnamed interest.

100 tons, Union church, San Gabriel, Calif., to unnamed interest.

100 tons, state highway work in Huerfano, Morgan, Custer and Lincoln counties, Colorado, to unnamed interest.

100 tons, or more, bars and small shapes, building, Rex hospital, Raleigh, N. C. to Truscon Steel Co., Youngstown, O.; William Muirhead Construction Co., Durham, N. C. general contractor.

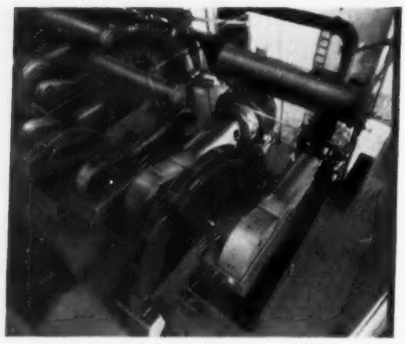
100 tons, state highway paving, Illinois, to Calumet Steel Co., Chicago.

100 tons, Ashland avenue viaduct approaches, Chicago, to Calumet Steel Co., Chicago.

STATIONARY

AIR OR GAS

COMPRESSORS



another!

Another "repeat" earned by CP Class "O" Compressors! Previous purchases by a large shipbuilding company included two CP 3500 c.f.m., 600 hp., and several 2200 c.f.m., 350 hp. Compressors. Their performance brought the order for the CP 7500 c.f.m., 1250 hp. Compressor shown with the 2200 c.f.m. machines in the illustration above.

Let CP Compressor users tell you why they "repeat". We shall gladly tell you who they are.

CHICAGO PNEUMATIC TOOL CO.
Sales and Service Branches All Over the World
6 EAST 44th STREET • NEW YORK, N. Y.

. . . AIR & GAS COMPRESSORS
DIAMOND CORE DRILLS
ROCK DRILLS • DIESEL ENGINES
ELECTRIC & PNEUMATIC TOOLS
VACUUM PUMPS & CONDENSERS
OIL WELL ROCK BITS & REAMERS

CHICAGO PNEUMATIC

Reinforcing Steel Pending

1042 tons, state bridge, Nisqually river, Washington; bids at Olympia, Wash., Nov. 13.

815 tons, Bull Lake dam, Riverton, Wyo.; bids soon.

800 tons, housing project, Milwaukee; George A. Fuller Co., New York, low for general contract.

690 tons, state overcrossing, Seattle; bids at Olympia, Wash., Nov. 13.

500 tons, approximately, housing development, Atlantic City, N. J., for the Stanley S. Homes village; general contract bids Nov. 12.

500 tons, two public schools, Philadelphia; bids Nov. 9. Approximately 500 tons of shapes also required.

245 tons, highway work in Yellowstone, Silver Bow, Big Horn, Flathead and Deer Lodge counties, Montana; bids opened.

220 tons, Unity dam, Vale project, Oregon; bids about Dec. 1.

200 tons, Sunshine Bucana Vista school, San Francisco; bids Nov. 20.

192 tons, consisting of 208,567 pounds for Jefferson township, Allegheny county, and 176,059 pounds for McCandless and Pine townships, Allegheny county; bids to state highway department, Harrisburg, Pa., Nov. 15.

175 tons, Ketchikan, Alaska, postoffice and jail; general contract to Warrack Construction Co., Seattle.

150 tons, high school, Newburyport, Mass.

125 tons, state bridge, Waltham, Mass.; bids Nov. 5.

120 tons, foundation work, three federal housing developments, Philadelphia, Wayne, Pa., and Washington, respectively; bids this week.

118 tons, highway work in Solono, Napa and Contra Costa counties, California; bids Nov. 13.

115 tons, state overpass, Spokane, Wash.; bids at Olympia, Wash., Nov. 5.

100 tons, high school, Reading, Pa.; specifications out shortly.

Unstated, infirmary buildings at Eugene and Corvallis, Oreg.; bids at Salem, Nov. 13.

Unstated tonnage, Emsworth lock and dam, Ohio river, Seeds & Durham Co., Philadelphia, low for general contract; 7000 to 8000 tons of rolled steel will be required for this project.

Strip Steel

Strip Prices, Page 107

Pittsburgh—Orders for hot-rolled and cold-rolled strip steel are now heavier individually and producers' operations are expanding. Last week operations for hot-rolled strip steel advanced about 4 points to 48 per cent and cold-rolled strip was strong at 50-55 per cent. The market remains quoted 1.85c, Pittsburgh, for hot-rolled strip and 2.60c, Pittsburgh or Cleveland, for cold-rolled.

Cleveland—Releases from automobile manufacturers led to a 10-point advance to 60 per cent in strip mill operations last week, and a higher rate is indicated for this week. Backlogs are increasing, and some mills are unable to give shipment on some of the higher finishes of strip until December.

Chicago—Moderate improvement is noted in shipments to automotive interests. Occasional slackening is reported in demand from miscellaneous consumers though the aggregate of such business is reasonably steady.

Boston—Cold strip demand is holding, incoming business being fairly brisk with most mills, a few producers reporting a slight gain in orders during the week. Buying is largely for immediate delivery. Some consumers, however, tend to purchase for more advanced requirements. Prices are steady at 2.80c, Worcester.

Wire

Wire Prices, Page 107

Pittsburgh—Orders for manufacturing wire products are steady and lend strong support in the present dull condition of merchant wire products. Most wire consumers are not anticipating requirements and continue to take in little more than a month's requirements in advance, thus adding to producers' costs.

Cleveland—Wire demand is off about 10 per cent from averages early in October. In advance of the price increase Oct. 1 jobbers and manufacturers replenished stocks, which have tended to reduce mill shipments. Although nut and bolt manufacturers are consuming material at a faster rate, current orders from them have not increased correspondingly. Farm requirements are at the lowest ebb of the year, a seasonal development. Wire producers generally expect a fairly steady rate of new buying over the remainder of the year.

Chicago—Wire demand is steady. Automotive orders have improved moderately. Needs of miscellaneous

users of manufacturers' wire are well maintained, but there is no improvement in demand from jobbers for wire products.

Boston—Wire buying, still led by specialties and manufacturer's wire, holds to the recent rate with some finishing mills rushed to meet deliveries. Demand for specialties covers a broad field, most going into consumer goods. Prices are firm and unchanged.

Pig Iron

Pig Iron Prices, Page 108

Pittsburgh — District furnaces have advanced prices on all grades of pig iron $1 a ton effective Nov. 1. This makes No. 2 foundry and malleable iron $19.50, Neville Island, Pa., Sharpsville, Pa., or Youngstown, O., base. On the same bases, basic is quoted $19 a ton, bessemer $20, and gray forge $19. The market is more active than at any time this year, with shipments expected to swell noticeably over the balance of this month. Producers are permitting shipments at the old price this month on specifications entered before Nov. 1.

Cleveland—Pig iron prices were advanced $1 a ton Nov. 1 at Cleveland, Youngstown, O., and Erie, Pa., following the increase of $1 at Chicago, Detroit and Toledo. The advance applies to all grades. No. 2 foundry and malleable now are $19.50 base Cleveland; basic, $19, and bessemer $20. Anticipating the rise, melters generally covered requirements for the remainder of the year, and in some instances will carry iron into next quarter, although furnace interests did not book for shipments beyond Jan. 1. A steadily rising trend is noted in the movement of iron to supply melters' actual current requirements. Besides an active demand from automobile foundries, heating and sanitary ware manufacturers are specifying liberally. Heavier shipments to railroads are expected later this year as car repair programs get under way.

Chicago—Increase of more than 20 per cent in October pig iron shipments over September attests to gains in foundry operations, since most speculative tonnage purchased prior to the price increase is not scheduled for delivery until November and December. While the upturn in schedules of automotive foundries has helped to swell recent iron shipments, gains have been equally as marked among miscellaneous consumers. New business is quiet with the market now $19.50, furnace for No. 2 foundry and malleable.

Boston — Effective Nov. 1, prices on all grades of pig iron were advanced $1 a ton, Everett, Mass. Anticipating this increase, consumers have bought heavier during the last 10 days with 7000 tons estimated to have been placed during the week. This buying was widespread and generally for lots under 500 tons each. There has also been forward buying of foreign iron, notably Dutch, some of the latter apparently for early first quarter delivery. Foundry melt tends upward, but slowly.

New York — The impending advances, which went into effect in the East on Nov. 1, stimulated the heaviest buying movement eastern producers have experienced in a long time. As a result a let-down in new orders is expected over the remainder of the year, although shipments are expected to continue the upward trend which has been so marked since last June. December movement should represent a new peak. All grades in the East have been marked up $1 a ton except low phosphorus which has been boosted 50 cents a ton to $24, eastern basing points. Royal Dutch and Indian iron have been advanced $1 a ton, as officially announced, to meet the general increases in domestic iron, with the seller of Royal Dutch having previously withdrawn all outstanding quotations. Certain other leading importers are also meeting the increases in domestic prices.

Philadelphia — Following recent substantial buying in expectation of the advance of $1 a ton, which became effective in the East Nov. 1, on basic, foundry and malleable grades of pig iron, a drop in new orders over the next several weeks appears logical.

Recent protective covering has brought new orders for most producers up to the highest point in many months. Meanwhile, shipments made further gains in October and are expected to show still additional increases over the remaining two months of this year.

Buffalo—Pig iron prices here were raised $1 a ton on all grades Nov. 1. The new base is $19.50, up $3.50 from the depression low. The final week of the lower price saw little buying as all consumers had covered for the quarter in anticipation of the rise. All eight furnaces now in production will be run throughout the winter, it is reported. New prices will apply on all iron purchased at lower figures and not delivered by the end of the quarter, also to all new business for shipment after Jan. 1.

Detroit—Pig iron sellers advanced

STAMPING LATITUDE » » » PLUS

TO permit a universal solicitation of *the difficult* in steel stampings necessitates an enormous productive range in presses. Parish masters this essential by maintaining a battery of presses producing parts under as little as 50 tons or as much as 4000 tons pressure and from plate as thin as 1/32 inch or as thick as 1/2 inch.

These facilities together with a complete engineering service are yours—whether for straight stampings in large quantities or composite design in small quantities . . . May we study *your* blue prints and specifications?

PARISH PRESSED STEEL CO.

Specialists in difficult stamping design

Robeson & Weiser Sts., READING, PA.

Pacific Coast Rep.: F. Somers Peterson Co., 57 California St., San Francisco, Cal.

the market on a Detroit base $1 a ton, effective Oct. 28. On all business not under contract previously, the market is now quoted $19.50, Detroit district furnace, for foundry and malleable irons, $19 for basic, and $20 for bessemer grades.

Cincinnati—Quotations on pig iron, Hamilton, O., base, remain unchanged, although an increase may be announced at any time. Contracting, both for the melt this quarter and inventory to take advantage of present prices, has been almost completed, bookings being for shipment this quarter only. Shipments tend steadily upward, with October tonnage the best this year.

St. Louis—Following the advance of $1 per ton in the price of pig iron, new purchasing by the industries in this area has contracted perceptibly. Shipments, however, are maintained on the high scale of recent weeks, and certain sellers are of the opinion that November may equal, or even top, the heavy tonnage forwarded in October.

Birmingham, Ala.—Despite reports from other sections of advance in price, $14.50, No. 2 foundry, is being maintained in the South. Production is still steady, with seven stacks in operation, two on basic and five on foundry. Production as yet is undisturbed by the coal strike, now in its sixth week.

Toronto, Ont.—New business in merchant pig iron is expanding, with production at the peak for the year. The daily melt has been increased to approximately 50 per cent. Pig iron prices are firm and an early advance is expected.

Scrap

Scrap Prices, Page 109

Pittsburgh—The market is fluctuating within a narrow range with mill buying at $13.25 to $13.50. Most holders of scrap are unwilling to sell at present levels. The two largest users in this district of railroad steel specialties have dropped out of the market and low phos specialty items are quiet with price unchanged. No. 1 heavy melting steel remains quoted $13 to $13.50 for this district, hydraulic compressed sheet scrap $13 to $13.50, and blast furnace borings and turnings, $8 to $9. Machine shop turnings at $9.50 to $10 now make it possible to bring in western supplies. Among railroad lists closing now are the Pennsylvania with 8300 tons of heavy melting steel, Nov. 7, the Baltimore & Ohio, Nov. 4, with 1000 tons of scrap rails and 800 tons of heavy melting steel, and the Pittsburgh & Lake Erie, Nov. 6, with a smaller list.

Chicago—Scrap prices are steady, the market drawing strength from activities of sellers in covering recent mill orders. Most steelworks are covered for at least 30 days and the trade looks for little new business before December. Heavy melting steel nominally remains $12.25 to $12.75, with bids on recent railroad lists ranging close to $13.

Cleveland—Iron and steel scrap is moving fairly freely to consuming mill and foundry interests here. Buying continues intermittent but improvement is expected next month since local mill consuming interests are operating practically at open-hearth capacity and expect to continue. A number of valley and Cleveland dealers have sold a moderate tonnage of open-hearth scrap on the basis of 13.75c for No. 1 steel. Valley prices are advanced 25 to 50 cents but at Cleveland no change has been made.

Boston—Expected advance in pig iron prices had a firming influence on scrap prices, notably cast grades. Exports to Italy continue, several thousand tons of No. 2 heavy melting steel being due to leave this week. Shippers paid $8.25 to $8.75, dock.

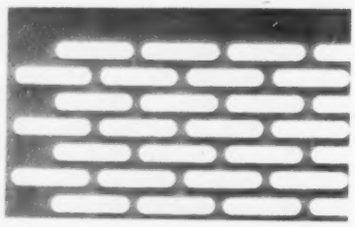
Philadelphia—Scrap prices here reflect little variation, with all major items unchanged. However, there has been a slight reduction in chemical borings and an advance in specification pipe. Slight weakness in steel scrap is expected to disappear shortly with the resumption of shipments at some important consuming centers. The leading eastern Pennsylvania consumer of steel scrap is picking up some No. 1 steel for Steelton, Pa., at $11.50 to $12, delivered. This producer is also paying $11.50, delivered, on steel for Sparrows Point, Md., a price unchanged for several weeks, and which interestingly is 50 cents a ton higher than the price he is now offering for his Lackawanna plant. This consumer recently closed on approximately 20,000 tons of heavy melting steel for Lackawanna at $12, delivered, all-rail basis, then closed on another substantial tonnage at $11.50, delivered. No tonnage is reported booked at this company's newest offering price of $11.

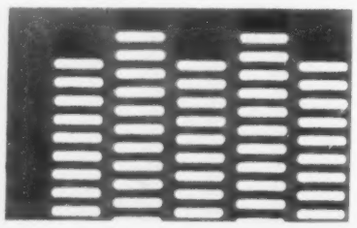
Buffalo—Sales of heavy melting steel scrap have held at $11.50 to $12 for practically all tonnage dealt in recently. A sale at $11 is not regarded as representative of the situation. Trading is light.

Detroit—Steel and iron scrap continues weak, a contributing factor being heavy automobile scrap production, which is unusual at this period. The No. 1 heavy melting steel market remains quotably unchanged at $9.50 to $10, hydraulic compressed sheet scrap, $10 to $10.50, and machine shop turnings, $5.25 to $5.75.

Cincinnati—Iron and steel scrap requirements of mills are fairly well covered for this quarter, and tonnage buying is absent. Dealers continue bullish and are holding material firmly. Yard supplies are fairly heavy, but efforts at further accumulation meet with mediocre success. Prices remain nominally unchanged.

St. Louis—There has been no weakening in iron and steel scrap prices despite continued apathy of melters. The main cause for strength is scant dealer supplies and light





WE CAN FILL THAT ORDER AT ONCE

For 56 years our name has stood for quality in perforated products. We have done business strictly on the basis of supplying the best, and supplying it at once.

To establish our reputation has required the closest scrutiny of raw materials, a faithful, highly trained personnel, and the maintenance of adequate stocks of blank metals.

Erdle perforated sheets are widely used for FANNING MILLS, THRESHING MACHINES, PULP MACHINERY, ELECTRICAL DEVICES, VENTILATORS, GRILLS, and for hundreds of other purposes.

Your requirements can be met in Sheet Aluminum, Brass, Copper, Steel, Tin, and Zinc.

Let us quote to your specifications.

Write us today.

ERDLE PERFORATING CO.
171 York St. ROCHESTER, N.Y.
56 Years in Business

offerings. Another factor was the advance in price of $1 per ton in pig iron.

Birmingham, Ala.—While no change is noted as to purchasing or in quotations, the market is firm. Heavy melting steel is moving a little better than other grades, at $8.50 to $9.50.

Seattle—The domestic situation in scrap is firmer than export. Local mills are again in the market, competing with exporting interests and paying $9.50 gross for heavy melting and $7.50 gross for No. 2 auto scrap.

Toronto, Ont.—Shipments of iron and steel scrap to the Hamilton district are increasing steadily and melters in other sections of Ontario and Quebec also are taking larger tonnages. Foundries are entering the market at frequent intervals for iron grades. No. 1 machinery cast has a steady call and there is fair demand for wrought scrap.

Warehouse

Warehouse Prices, Page 110

Pittsburgh—Steel jobbers here are now quoting a flat discount of 70 off list for bolts and nuts for both case and less-case lots. Other steel prices are unchanged for shipment out of stock, with demand declining.

Cleveland—Warehouse orders and tonnage for October increased over September; for some, orders as much as 30 per cent. The current trend is upward. Considerable price irregularity still exists between Cleveland and Pittsburgh.

Chicago—October sales showed a slight gain over September, business being near the peak for the year. A seasonal letdown is anticipated during November and December. Prices are steady and unchanged.

Philadelphia—While the improvement was not shared in by all jobbers, general trading in October appeared to be better than in the preceding month, and for some resellers was as good as at any time this year. Prices are steady.

Baltimore—Following brisk business early in the month, jobbing demand sagged over the later half of October. However, this recession may be only temporary, although too little time has elapsed in November to tell.

Detroit—Recognizing an easier market in bolts and nuts, the market has been officially reduced for case and less-case lots out of warehouse to a discount of 70-10 off list. This applies for carriage and machine bolts, as well as lag screws. General demand is declining slightly.

Cincinnati—Sales during October showed a modest gain in tonnage over September, with demand broad. Bars were moving freely. Some tonnage was believed imminent from new governmental projects. Prices are steady.

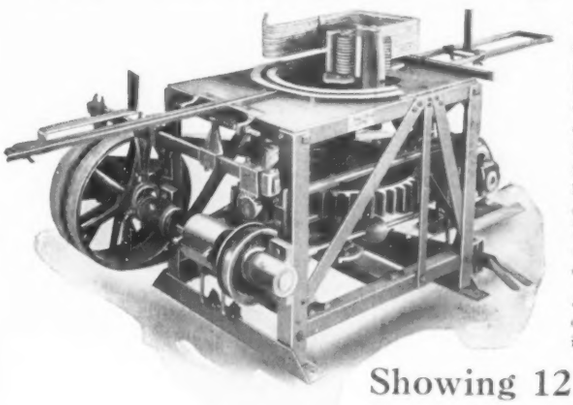
St. Louis—October volume is moderately in excess of that of the preceding month, and the largest for any October since 1930. The increase is accounted for chiefly by a heavier movement of building materials. Demand for galvanized sheets continues brisk, with shipments to the South making a particularly favorable showing.

Seattle—Buying is in small lots. The Coulee, Wash., and Bonneville, Creg., dam projects are furnishing steady business, but there is practically no mill buying in volume. Prices are being generally maintained, with occasional complaints of cutting in the Portland district.

Quicksilver

New York—Quicksilver prices are steady in a quiet market. Small lots are $75 to $76, a virgin flask of 76 pounds on occasional sales, while larger lots are nominally down to $74 a flask, with supplies scarce.

The Kardong Stirrup Bender



This bender is the result of our 20 years experience in the manufacture of reinforcing steel benders. One man can easily turn out four-bend stirrups from ⅜' stock at the rate of 300 or more per hour thus keeping labor costs at a minimum. A Handy bender for small slab bars and miscellaneous bending.

Ask for catalogue of our complete line of reinforcing steel Benders.

Showing 12 ⅜" stirrups bent in one operation

Kardong Brothers, Inc.
Minneapolis, Minn.

BISCO . . .
TOOL STEEL TUBING
NON-SHRINK OIL HARDENING
FOR
Ring Dies — Spacers — Bushings
Stock up to 12" O. D. 2" Wall
Larger sizes available
Complete Stocks of Ball Bearing Tubing
52100 & 4615 Analyses

THE BISSETT STEEL COMPANY
CLEVELAND
CHICAGO CINCINNATI
FINE TOOL STEELS
TUNGSTEN CARBIDE DIES & TOOLS

Iron Ore

Iron Ore Prices, Page 109

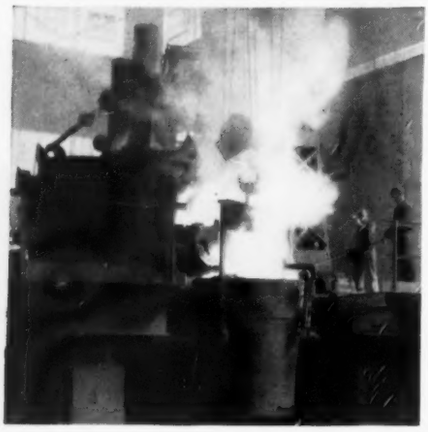
Cleveland—Lake Superior iron ore shipments for the season probably will total 28,000,000 tons, 27 per cent over 1934. Estimated shipments for October are 4,400,000 tons, compared with 4,800,000 tons in September. The movement for the season to Nov. 1 foots up to 26,600,000 tons. About 1,500,000 tons additional are scheduled for November.

Pittsburgh Steamship Co., subsidiary of the United States Steel Corp., will discontinue handling iron ore Nov. 4, although a few of its boats will carry limestone until Nov. 10. It had 36 in commission Oct. 15, out of its fleet of 86. On that date a total of 155 vessels were engaged in carrying ore. Some of the independents will continue until Nov. 20.

It is apparent ore consumption this year will be at least 29,500,000 tons, and therefore heavier than shipments. Not only have stocks been reduced at furnaces, but mine stockpiles also have been lowered. With consumption increasing stocks declining, producers see ahead a year of more favorable prospects in the industry.

BASIC ELECTRIC STEEL

FORGINGS



N.F.& O. Basic Electric Steel produced under rigid metallurgical control is an important *quality* factor in the ultimate forged product

BASIC ELECTRIC STEEL

Carbon, Alloy, Corrosion Resistant and Special Steels Smooth Forged, Hollow Bored, Rough or Finish Machined, Heat Treated to Specifications ... Forging Quality Ingots, Pressed or Hammered Billets.

NATIONAL FORGE AND ORDNANCE COMPANY

IRVINE, WARREN COUNTY, PENNA.

Semifinished

Semifinished Prices, Page 107

An advance of at least $1 and possibly $2 a ton is impending on sheet bars, rerolling billets and skelp, according to reliable reports late last week. Pittsburgh base prices at present are $28 per gross ton for sheet bars, $27 for billets, blooms and slabs, and 1.70c per pound for all grades of skelp. The advance undoubtedly would be reflected in various finished steel products in the near future. Increased costs of coal, coke, pig iron, fluorspar and other raw materials are the principal factors.

Metallurgical Coke

Coke Prices, Page 107

Although coke sellers find continued warm weather a detriment to domestic sales, the metallurgical coke market is firm at advanced prices. On the beehive grade, standard furnace coke is quoted at $3.55 to $3.70, for standard furnace analysis, Connellsville, Pa., oven base; foundry coke is $4.35 to $4.50 for common grades, and premium foundry at $5.50 to $5.75.

By-product foundry coke at Chicago showed a slight gain in October and $9, ovens, for outside delivery and $9.75, delivered, Chicago, is extended through November. Specifications in the Cincinnati district continue to expand at steady prices. Production at Birmingham, Ala., is being continued in spite of a strike of coal miners.

Ferroalloys

Ferroalloy Prices, Page 108

New York—Ferromanganese shipments continue brisk, with the market unchanged at $85, duty paid, Atlantic and Gulf ports. Domestic spiegeleisen 19 to 21 per cent, is $26 on lots up to 50 tons; $24, base Palmerton, Pa., on 50 tons and over.

Steel in Europe

Foreign Steel Prices, Page 110

London—(*By Radio*)—Iron and steel markets of Great Britain continue to show strength, with Germany and South Africa buying steadily. Trade in pig iron and steel is hampered by scarcity of domestic billets and the Continental quota is reported to have been temporarily increased to meet the situation. Rail and structural steel are active and demand for shipbuilding steel is expanding. Galvanized sheet exports are increasing steadily but other sheets and tin plate are quieter.

The Continent reports improvement in exports of steel, giving some producers work to the end of the year. Demand from India and the Far East for bars and sheets is fairly heavy.

Nonferrous Metals

Nonferrous Metal Prices, Page 108

New York — Active demand for lead was the daily market feature of nonferrous metals last week. New purchases of copper, zinc and tin were light but prices held steady.

Copper—Light sales caused no surprise in the trade and no uneasiness over price levels. All first hand sellers quoted 9.25c, Connecticut, for electrolytic, while offerings of resale copper at shaded levels failed to prompt much attention. Shipments continued to move actively to consumers.

Lead—Apparent urgent need for lead among consumers with inquiry for October metal in evidence until nearly the close of the month was surprising to even members of the lead producing industry. Prices, however, showed no tendency to advance and all producers continued to quote 4.35c, East St. Louis.

Zinc—Sales of prime western were light but shipments moved at a satisfactory pace to consumers. Sellers held to steady price levels on the basis of 4.85c, East St. Louis, for prime western.

Tin—Scarcity of Straits spot and nearby tin supplies in the domestic market contributed in a forceful way to price firmness despite wide fluctuations in London. The Straits spot closed around 51.75c.

Antimony—Prices were easy on reports of weakness in China. Chinese spot dropped to 15.00c, duty paid New York, while American spot dropped to 14.75c, New York.

Equipment

Chicago—October showed a small pickup in machine tool sales compared with September, though orders still are below July or August. Inquiries remain moderately active, with considerable interest being shown in modernization programs.

Signs of better activity at railroad shops have yet to be accompanied by any major equipment buying programs.

Seattle—Considerable activity is reported in logging material, used equipment moving in volume. Demand for mining equipment in Alaska has been reduced by the approach of winter. Puget Sound navy yard, Wash., opened bids Oct. 29 for a drill press and milling machine.

Boston—Machinery and plant equipment orders hold up well with numerous shops having backlogs for several months' near-capacity operations. Inquiry is also active. While there has been some spotty improvement in the demand for textile mill equipment, other branches of the machine tool industry have made larger gains comparatively. Improvement with builders of heavier tools has been a feature while special machines developed within the last two years move briskly.

Pittsburgh—Mackintosh-Hemphill Co., here has received an order for a 52-inch three-high fully automatic controlled sheet mill from the John Lysaght Newcastle Works Ltd., Port Warath, New South Wales, Australia, for immediate shipment. Complete with furnaces, tables, rolls, etc., the expenditure is estimated at about $600,000. Carnegie-Illinois Steel Corp. last week verified bid tabulations received from equipment builders on the new 100-inch semicontinuous universal plate mill for its Homestead works but has not announced low bidders. Youngstown Sheet & Tube Co. has authorized expenditure of about $1,000,000 to complete facilities at its new 79-inch strip mill. Equipment for which this sum will be spent includes cold rolling, annealing, and pickling machinery.

Twenty-five bell-type coiled strip annealing furnaces have been installed at the Rouge plant of Ford Motor Co., Westinghouse here supplying 12 and General Electric 13. The bright annealing units are rated at 230 kilowatts and each will anneal two 16,000-pound coils of strip 52 inches outside diameter, 30 inches inside diameter and 48 inches high. Bases and metal hoods were included in the installation.

Window frames and sashes for the annex to the library of congress, Washington, will be stainless steel, requiring 85 tons.

WORTHINGTON READY WITH CREDIT PLAN FOR MACHINERY

Worthington Pump & Machinery Corp., Harrison, N. J., is announcing a term payment purchase plan developed by it to enable purchasers of its products to take advantage of provisions of the national housing act. Claimed to be the first manufacturer of industrial equipment to develop and announce such plan, Worthington states that loans up to $50,000 for improvements on any one property are available, they can be amortized in equal monthly payments extending over five years, interest is at 5 per cent.

The Johns-Manville Co., New York, last week also announced that its subsidary, the Johns-Manville Credit Corp. is an approved lending institution under FHA and loans are available to manufacturers for modernizing.

ANY METAL
•
ANY PERFORATION
INDUSTRIAL and ORNAMENTAL
Perforated Metals
Regardless of your problems, whether they demand the screening of very fine and treacherous materials such as minerals, chemicals and other simularly hard-to-screen products or your requirements include grilles for use where beauty is a major consideration, you will find H. & K. perforations particularly suited to your purpose. Send us your specifications and permit us to prove H.&K. standard of accuracy and lasting perfromance.
The Harrington & King PERFORATING Co.
5634 FILLMORE ST., CHICAGO
114 LIBERTY ST., NEW YORK

PIONEERS

in Copper and Bronze Castings for almost a half century.

LAWRENCEVILLE BRONZE COMPANY

We specialize in the manufacture of *Blast Furnace Copper Castings*

MILL BEARINGS
HEAVY MACHINERY BRONZE

QUALITY CASTINGS ONLY

Send us your inquiries

BESSEMER BLDG. PITTSBURGH, PA.

Construction and Enterprise

Michigan

ALMA, MICH.—Wright Tool Co., Bowling Green, Ky., plans altering and remodeling the former plant of the LaFrance-Republic Truck Co., for its own use. Cost estimated at over $30,000.

ALGONAC, MICH.—City has voted bonds for security in financing new waterworks project, including filtration plant, pumping station, and installation of electric motor-driven centrifugal pump and auxiliary. Estimated cost $33,000. G. Jerome & Co., 1850 National Bank building, Detroit, engineer.

DETROIT—Wayne Screw Products Co. has been incorporated with $400,000 capital to deal in screw products, by John J. Corin, 2037 Oakman boulevard.

DETROIT—Handy Governor Corp. has leased approximately 20,000 square feet of the Studebaker plant at Clark and West Jefferson streets, for the manufacture of Handy aircleaners. Equipment and machine tools are being installed.

DETROIT—Pittsburgh Plate Glass Co., Grant building, Pittsburgh, has approved appropriation to build a new building and manufacturing unit for the Ditzler Color Co., Detroit, a wholly-owned subsidiary.

DETROIT—Koppitz-Melchers Inc. has begun construction of a $1,000,000 brewery at Dubois street and the Detroit river. Plans include a brewhouse, offices, boiler house, engine room and shipping room. B. A. Koppitz is president and general manager.

GRAND RAPIDS, MICH.—Applied Arts Corp., manufacturer of small equipment and accessories for the automotive and refrigerator industries, will launch an expansion program shortly. Negotiations are under way for purchase of the plant of the Grand Rapids Felting Co. which will give the company 10,800 additional square feet of floor space.

ISHPEMING, MICH.—Municipality plans waterworks distribution system, costing $170,000. Gunnard Anderson, engineer.

MUSKEGON, MICH. — Hercules Motors Co., Canton, O., is establishing a new branch plant here. The company has taken over a building formerly occupied by the Clark Sanding Machine Co. New equipment and machinery will be moved at once.

Connecticut

FAIRFIELD, CONN.—McKesson & Robbins Inc. has approved plans for new multi-story addition to its drug and pharmaceutical manufacturing plant, all equipment to be electric-operated. Cost close to $100,000. Albert Kahn Inc., New Center building, Detroit, architect and engineer.

HARTFORD, CONN.—Veeder Root Inc., G. Anthony president, is preparing plans for a 4-story, 42 x 165-foot addition to its present plant, costing about $75,000.

New York

BAYVILLE, N. Y.—Town plans constructing a well and installing pumping equipment and elevated tank, at a cost of $45,000. S. B. Brown, Mineola, N. Y., engineer.

LONG ISLAND CITY, N. Y.—Plans have been filed with the Queens building bureau here for a factory to be built by the American Brake Shoe & Foundry Co., 230 Park avenue, New York, at the northeast corner of Riverside avenue, at a cost of $150,000.

NEW YORK—Gordon H. Ebsen Inc. has been incorporated with $20,000 capital to operate a machine shop. Papers filed by R. C. Pinkham & Co., 138 Roosevelt avenue, Flushing, N. Y.

NEW YORK—City, F. H. LaGuardia mayor, will hold an election Nov. 5 to vote on proposition to construct a municipal power plant, cost of which is estimated at $45,000,000.

NEW YORK—Universal Gypsum & Lime Co., 420 Lexington avenue, plans improving its plants at National City, Mich.; Akron, N. Y.; Clarence Center, N. Y.; York, Pa.; and Rotan, Tex., at an expenditure of about $40,000 for each plant.

NEW YORK—General Castings Co. Inc., has been incorporated to manufacture steel, iron and bronze castings, by Flora B. Tompkins, Samuel S. Tompkins, Charles S. Moan. Papers filed by Frederick A. Behrens, 50 Broadway, New York.

PORT OF ALBANY, N. Y.—Friedman Steel Trading Corp., recently organized with $10,000 capital, to engage in handling and export of scrap iron, has leased a site here and will install all equipment, including cranes.

Pennsylvania

BESSEMER, PA. — Boro plans municipal waterworks system, costing about $78,000. Project has been approved by PWA. C. H. Milholland, New Castle, Pa., engineer.

BLAW KNOX, PA.—Boro plans waterworks improvements, costing $32,727. Funds have been approved by PWA. O. A. Pluskey, 217 Delafield avenue, Aspinwall, Pa., engineer.

DAISYTOWN, PA.—Town is preparing plans for waterworks system. Project has been approved by PWA. Estimated cost $88,500. O. P. Thomas, 50 Main street, Johnstown, Pa., engineer.

ERIE, PA.—Swanson Tool & Machine Corp., 810-12 East Eighth street, has let contracts for construction of an addition to its plant. In addition to this expansion, the plant will have a new heating system.

Ohio

CLEVELAND—Ohio Welder Co. has been incorporated with 250 shares of no par, by John A. Alburn, A. E. Averill and Cary R. Alburn. Correspondent: John A. Alburn, 1585 Union Trust building.

CLEVELAND—Ohio Public Service Co. is making an engineering survey of a projected $2,000,000 expansion and replacement program at its Warren, O., plant. A 35,000-kilowatt turbine and new boilers will be installed. T. O. Kennedy is general manager.

CLEVELAND — Marquette Metal Products Co., 1145 Galewood avenue, is building a new assembly plant adjacent to its manufacturing plant, for the manufacture of diesel engines. The building will contain 12,000 square feet and will cost about $40,000. W. S. Jack is president.

FAIRPORT, O.—Village is planning to erect an electric power plant, costing approximately $334,000.

SHILOH, O.—Village is completing plans for constructing steel plate elevated storage tank, and two pump houses. Total cost estimated at $36,000. North Central Ohio Engineering Co., Richland Trust building, Mansfield, O., engineer.

Illinois

BENSONVILLE, ILL. — Chicago, Milwaukee, St. Paul & Pacific Railroad Co., C. F. Loweth chief engineer, Union street, Chicago, has awarded contract to Thorgerson & Erickson, 228 North LaSalle street, for constructing 1-story, 70 x 190-foot machine shop, costing about $150,000.

HERRIN, ILL. — Fire recently caused considerable damage to the boiler and engine room of the Egyptian Powder Co. plant near here.

MENDON, ILL.—City will soon take bids for waterworks and distribution system, costing $44,000. Russell & Axon, 4903 Delmar boulevard, St. Louis, engineer.

VALIER, ILL.—Valier Coal Co. is considering erection of a power plant and installing equipment. Maturity is indefinite.

Indiana

INDIANAPOLIS — Chevrolet Motor Co., 420 West Milwaukee street, Detroit, has begun work on a large new plant here for the manufacture of commercial bodies. The new buildings will total 470,400 square feet of floor space, and will include a power house.

LEBANON, IND.—Hicks Body Co. has acquired the plant of the Indestructible Wheel Works, as a step in its expansion program.

Minnesota

HENNING, MINN. — Village, S. A. Aune clerk, has plans completed for waterworks system, costing approximately $50,000. PWA has allotted fund of $22,950.

Alabama

BESSEMER, ALA. — Harold L. Ickes, PWA administrator, has allocated $1,238,182 loan and grant for financing construction of 30,000-kilowatt power substation and 50-mile transmission line.

GUNTERSVILLE, ALA.—City receives bids Nov. 27 for construction of power plant. PWA project.

HACKLEBURG, ALA.—Town, F. J. Osborn mayor, will take bids Nov. 7 for constructing waterworks system, including installation of pumps and motors, 60,000-gallon tank on steel tower, chlorinator, tapping machine, oil heater, improvements to pump house, etc.

HARTSELLE, ALA.—City receives bids Nov. 29 for erection of power plant. PWA project.

MUSCLE SHOALS CITY, ALA.—City, Mayor Green, has been granted loan of $32,000 to modernize and expand the local TVA power system.

RUSSELLVILLE, ALA.—City receives bids Dec. 5 for power system. PWA project.

TARRANT CITY, ALA. — PWA Administrator Harold L. Ickes has allotted $329,094 to city for constructing electric distribution system.

Maryland

SHARPTOWN, MD.—City receives bids Nov. 8 for waterworks system.

(*Please turn to Page* 131)

ABSOLUTE AUCTION

REAL ESTATE

MACHINERY AND EQUIPMENT

THE NORTH TONAWANDA AND FRAMINGHAM PLANTS OF

NATIONAL RADIATOR CORPORATION

On the respective premises

TUESDAY, NOVEMBER 19, 1935, at 10 A. M.

8th and IRONTON STREETS, N. TONAWANDA, N. Y.

REAL ESTATE: Tract of about 9.9 acres improved with a group of Manufacturing Buildings, approximately 80,000 sq. ft. floor area.

MACHINERY AND EQUIPMENT: *Needham, Moline & Bryant 4 spindle horizontal radiator boring machines*, Niagara radiator brushing and cleaning machine, Bryant boiler nipple lathes, Bryant nipple threading machine, Deming hydraulic pump, Sedberry pulverizer, sand blast machines, Standard sand facing machine, *Shepherd and American electric overhead hoists*, Curtis 5 ton air hoists, Terry structural steel 5 ton jib crane, Mercury industrial tractor, 7 Sly heavy steel tumbling mills; Barnes, Snyder, New Haven and Stinson vertical drill presses, Garvin single end grinder, Cincinnati electric post drill, Burr portable key seater, Ingersoll Rand air compressor, *G. E. continuous current generating set*, 31 electric motors up to 75 H. P., starters, compensators, generators, transformers and switchboards, tracking, scrap, steel, office furniture, cafeteria equipment, etc.

FRIDAY, NOVEMBER 22, 1935, at 10 A. M.

End of ARLINGTON STREET, FRAMINGHAM, MASS.

REAL ESTATE: Approximately 23 acres of land improved with a group of brick and frame manufacturing buildings containing approximately 197,000 sq. ft. floor area. Railroad siding.

MACHINERY AND EQUIPMENT: 2 Whiting and Paxon Cupolas, No. 9½ and No. 2. 2 Root Pressure Blowers, No. 6½, *Shepherd 5-ton Electric Cupola Charging Crane*, Shepherd Electric Clam Shell Bucket, Charging Boxes, 150 ft. Steel Travelling Crane Runway, 17-15 *ft. Travelling Cranes*, 12 Curtis Pneumatic Hoists, Pneumatic Floor Vibrators, Herman Pneumatic Turnover Pattern Drawing Machine, Industrial Lift Trucks, Large quantity Iron and Wood Flasks, 3 *American and Cleveland Electric and Gasoline Driven 84" Sand Breakers*, 10 Patent Roll Front Core Oven Doors, 60 Steel Core Oven Skids and Cars, 125,000 lbs. Cast Iron Floor Plates, 300 H. P. A. C. Electric Motors, 5 to 40 H. P. Chicago Portable Loader, Belt and Steam Hydraulic Pumps and Air Compressors, 2 Landis Pipe Machines 1½ to 5", 2 Whitcomb 24" and 32" Machine Planers, *Baker, Blaisdell, Aurora and other Drill Presses 16 to 32"*, Bolt Threader, Hydraulic Rotary 3 wing Radiator Press, 118" Blacksmiths' Tools, 60" American Blowers, Reaming Machine, Tool Grinders, Stock Room Supplies, 300 H. P. Corliss type Steam Engine, 7—10 K. V. A. Transformers, Switchboard, Portable and Bucket Type Conveyors, 4 Heavy Duty Cast Iron Rumblers, Vises, Shafting, Trucks, Scrap, Office Furniture, etc.

NOTE: Because of the concentration of business in their other plants, the Board of Directors of the National Radiator Corporation has ordered this absolute liquidation at auction.

A separate descriptive catalogue has been issued for each of these two sales and will be furnished upon application to

SAMUEL T. FREEMAN & CO., AUCTIONEERS

27 WILLIAM ST.	1808-10 CHESTNUT ST.	80 FEDERAL ST.
NEW YORK	PHILADELPHIA	BOSTON

WHERE-TO-BUY

A classified list of advertisers according to products. ¶Index to advertisements gives page number of any advertiser.

ABRASIVES (Polishing)
Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester, Mass.

ACCUMULATORS
Morgan Engineering Co., The, Alliance, O.

ACETYLENE
Air Reduction Sales Co., 60 East 42nd St., New York City.
Linde Air Products Co., 30 E. 42nd St., New York City.

ACID-PROOF LININGS
Ceilcote Co., The, Rockefeller Bldg., Cleveland, O.

ACIDS (Pickling)
American Chemical Paint Co., Ambler, Pa.

AIR COMPRESSORS—See COMPRESSORS (Air)

ALLOYS—See FERROALLOYS

ANGLES, CHANNELS—See BEAMS, CHANNELS, ANGLES

ANGLE IRON BENDERS
Excelsior Tool & Machine Co., Ridge and Jefferson Aves., East St. Louis, Ill.

ANODES (All Types)
The Udylite Co., 1615 E. Grand Blvd., Detroit, Mich.

AXLES
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 So. LaSalle St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, O.
Standard Steel Works Co., Burnham, Pa.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.

BABBITT METAL
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.

BANDS—See HOOPS AND BANDS

BANDS (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 So. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
The Stanley Works, New Britain, Conn. Bridgeport, Conn.

BAR BENDERS
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.

BARGES (Steel)
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
McClintic-Marshall Corp., Bethlehem, Pa.

BARRELS (Plating)
The Udylite Co., 1615 E. Grand Blvd., Detroit, Mich.

BARRELS (Steel)
Pressed Steel Tank Co., Milwaukee, Wis.

BARS (Alloy)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Timken Steel & Tube Co., Canton, O.

BARS (Concrete Reinforcing)
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Youngstown Sheet & Tube Co., Youngstown, O.

BARS (Iron)—See IRON (Bar)

BARS (Steel)
(** Also Stainless*)
*Bethlehem Steel Co., Bethlehem, Pa.
*Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
*Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
*Jessop Steel Co., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
*Ludlum Steel Co., Watervliet, N. Y.
*Midvale Co., The, Nicetown, Philadelphia, Pa.
*Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
The Stanley Works, New Britain, Conn. Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

BATTERIES (Storage)
Thomas A. Edison, Inc., Orange, N. J.

BEAMS, CHANNELS, ANGLES, ETC.
(** Also Stainless*)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
*Jessop Steel Co., Washington, Pa.
*Ludlum Steel Co., Watervliet, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

BEARINGS (Ball)
Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Norma Hoffmann Bearings Corp., Stamford, Conn.
New Departure Mfg. Co., Bristol, Conn.

BEARINGS (Bronze)
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
Cramp Brass & Iron Foundries Co., Paschall Sta., Philadelphia, Pa.
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Rhoades, R. W., Metaline Co., 50—3rd St., Long Island City, N. Y.
Shenango-Penn Mold Co., Dover, O.

BEARINGS (Journal)
Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Oilless)
Rhoades, R. W., Metaline Co., 50—3rd St., Long Island City, N. Y.

BEARINGS (Quill)
Bantam Ball Bearing Co., South Bend, Ind.

BEARINGS (Radial)
Bantam Ball Bearing Co., South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
New Departure Mfg. Co., Bristol, Conn.
Timken Roller Bearing Co., Canton, O.

BEARINGS (Roller)
Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
Norma Hoffmann Bearings Corp., Stamford, Conn.
S K F Industries, Inc., Front St. & Erie Ave., Philadelphia, Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Roll Neck)
Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Timken Roller Bearing Co., Canton, O.

BEARINGS (Roller Tapered)
Bantam Ball Bearing Co., South Bend, Ind.
Timken Roller Bearing Co., Canton, O.

BEARINGS (Rolling Mill)
Bantam Ball Bearing Co., South Bend, Ind.
Cramp Brass & Iron Foundries Co., Paschall Sta., Philadelphia, Pa.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.
Norma Hoffmann Bearings Corp., Stamford, Conn.
Timken Roller Bearing Co., Canton, O.

BEARINGS (Thrust)
Bantam Ball Bearing Co. The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Norma Hoffmann Bearings Corp., Stamford, Conn.
Timken Roller Bearing Co., The, Canton, O.

BENDING AND STRAIGHTENING MACHINES
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.
Morgan Engineering Co., The, Alliance, O.
Thomas Spacing Machine Co., Pittsburgh, Pa.

BENZOL AND TOLUOL RECOVERY PLANTS
Koppers Construction Co., 1438 Koppers Bldg., Pittsburgh.
Youngstown Sheet & Tube Co., Youngstown, O.

BILLETS (Alloy and Carbon Steel)
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., Newport, Ky.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. La Salle St., Chicago, Ill.
Republic Steel Corp., Youngstown, O.
The Stanley Works New Britain, Conn. Bridgeport, Conn.
Timken Steel & Tube Co., Canton, O.
Washburn Wire Co., Phillipsdale, R. I.

BILLETS (Forging)
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., Newport, Ky.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Republic Steel Corp., Youngstown, O.
Standard Steel Works Co., Burnham, Pa.
The Stanley Works, New Britain, Conn. Bridgeport, Conn.
Timken Steel & Tube Co., Canton, O.

(Concluded from Page 128)

costing $47,000. Clarke Gardiner, engineer, Salisbury, Md.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will take bids Nov. 8, schedule 6368, one motor-driven universal turret lathe, delivered Philadelphia; schedule 6372, one motor-driven hydraulic horizontal broaching machine, delivered Washington; schedule 6373, one motor-driven air compressor, delivered Keyport, Wash.; schedule 6378, one motor-driven universal milling machine; schedule 6379, one motor-driven toolrom precision lathe, and schedule 6387, one motor-driven toolmaker precision lathe, all delivered Annapolis, Md., schedule 6381, one motor-driven butt welding machine, delivered Norfolk, Va.

Kentucky

EKRON, KY.—J. A. Barry Distillery Co. is considering making extensions to its distillery, costing about $45,000, with equipment.

LOUISVILLE, KY.—Joseph E. Seagram & Sons Inc., 405 Lexington avenue, New York, plans installation of motors and controls, conveyors, loaders and other equipment in the new distilling plant it is erecting here. A power house will be built. Total cost estimated at $1,500,000.

SCOTTSVILLE, KY.—City, Rory O. Huntsman mayor, receives bids Nov. 7 for constructing sewer system. Cost of system and three treatment plants is estimated at $80,000.

Louisiana

LAKE PROVIDENCE, LA.—Lake Providence Ice & Coal Co. plans rebuilding its plant recently damaged by fire.

Florida

DADE CITY, FLA.—J. A. Carver has leased a building which he is remodeling into a cannery, and is erecting a 24-foot addition. Modern machinery will be installed, including a coloring machine.

North Carolina

SILVER CITY, N. C.—Town, W. O. Mann clerk, will take bids Nov. 15 for constructing waterworks system, consisting of furnishing materials and installing filter plant equipment, furnishing three motor-driven centrifugal pumping units complete with motors and switchboards, furnishing and installing a water tank.

WILMINGTON, N. C.—City, department of public work, McKean Maffit, superintendent and acting engineer, is preparing plans and will soon call bids for the following: Four used 25,000-gallon daily filters, new 800-gallon per minute motor-driven low lift centrifugal pump, and a new 4000-gallon per minute oil or gas engine driven, high lift centrifugal pump.

Tennessee

MURFREESBORO, TENN.—City, W. T. Gerhardt mayor, receives bids Nov. 18 for constructing sewage disposal plant, consisting of clarifiers, separate sludge digestor and trickling filters. Fund of $66,317 is available.

West Virginia

HINTON, W. VA.—United States engineer office, Huntington, W. Va., has surveys under way for new Bluestone reservoir and dam on New river, near here. Project will include erection of a hydroelectric generating plant, with transmission and distribution lines. Cost about $13,000,000. An initial appropriation of $1,000,000 is available.

Missouri

CABOOL, MO.—City, T. Conklin mayor, plans erecting municipal light and power plant, costing about $50,000. Application has been made for PWA grant of $22,000 and loan of $28,000. M. B. Messler, 918 South Broadway, Springfield, Mo., engineer.

ST. CHARLES, MO.—City plans light and power plant, including installation of diesel engine generating equipment, costing approximately $65,000. Application has been made to PWA for grant. Russell & Axon, 4903 Delmar boulevard, St. Louis, engineer.

ST. LOUIS—Falstaff Brewing Corp., 3684 Forest Park boulevard, is contemplating erection of an addition to its brewery, 31 x 44 feet, costing approximately $10,000.

Arkansas

RISON, ARK.—City, George H. Holmes mayor, receives bids Nov. 6 for furnishing tools, equipment and constructing complete sanitary sewer system, including sedimentation tank, sludge digestion tank, pump house, etc.

ROGERS, ARK.—Carnation Co., 130 North Wells street, Chicago, has acquired the Rogers Dairy Products Co. plant, and plans alterations and improvements to same. Cost will exceed $28,000.

Oklahoma

OKLAHOMA CITY, OKLA.—City, Tom G. Banks, city water superintendent, will submit complete plans for filtration and sewage disposal plant to PWA for approval Nov. 5, cost of which is estimated at $140,000. Work will start as soon as funds are available.

Texas

HOUSTON, TEX.—W. J. Colegrove, P. O. Box 1876, wants prices and data on a full diesel engine, direct connected to a 250 to 325-kilowatt generator, with switchboard, exciter, etc.

HOUSTON, TEX.—William A. Brunet, Shell building, has been awarded contract for construction of warehouse and office building here for the Earle M. Jorgenson Co., 1051 South Alameda avenue, Los Angeles. Warehouse building will be 64 x 181 feet, with crane way 60 x 283 feet. Cost is estimated at $18,000, not including installation of crane, machinery and other equipment.

Kansas

CLAY CENTER, KANS.—City is making plans for general waterworks improvements, including installation of a 500,000-gallon tank. Estimated cost $30,000. Project has been approved by PWA. C. A. Haskins & Co., 517 Finance building, Kansas City, Mo., engineer.

IOLA, KANS.—City plans erecting new power plant, including new generating units and turbine improvements. Estimated cost $280,000. Application has been filed with PWA for loan and grant. Paulette & Wilson, Salina, Kans., engineer.

North Dakota

GRAND FORKS, N. DAK.—City is arranging a bond issue of $475,000 for erection of electric light and power plant. Work will begin soon. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., consulting engineer.

Nebraska

IMPERIAL, NEBR.—City has prepared plans for erection of electric light and power plant, costing about $60,000. Fund is being secured through federal aid. Henningson Engineering Co., Union State Bank building, Omaha, Nebr., consulting engineer.

Colorado

DELTA, COLO.—City has plans for erection of a municipal hydroelectric power plant for which PWA has approved a loan and grant of $197,000. Wood & Weber, 1035 Pearl street, engineer.

DENVER — White Co., 31-10 Thompson avenue, Long Island City, N. Y., plans to purchase a building here to be altered and equipped for a branch factory and service building. Cost will exceed $40,000.

Arizona

FLAGSTAFF, ARIZ. — Flagstaff Electric Light Co. has concluded arrangements with Arizona Power Co., Prescott, Ariz., for new 400-kilowatt transmission line from hydroelectric generating station of the latter utility to Flagstaff city limits. The Flagstaff company will build a substation at a cost of about $75,000.

Pacific Coast

GRESHAM, OREG.—A special election was held Oct. 26 to pass on a proposed sewer project, estimated to cost $118,181, of which PWA will furnish $53,181. Plans include a sewage disposal plant.

SEATTLE—Robert W. Gates, liquidator, will receive bids Nov. 15 for the sale of the stock of the Hofius Steel & Equipment Co., First avenue, South, and Hudson street. Inventory includes plant machinery, locomotives, cars, rail and rail accessories, hydraulic hoist parts, etc.

PORT ORCHARD, WASH.—Silver Springs Brewing Co. has plans for construction of a concrete bottling plant, 30 x 60 feet.

SHELTON, WASH.—Reed Mill Co., producer of lumber products, is planning to make repairs and install equipment, including a hammer head crane and a fuel unit.

SPOKANE—Call for bids for turbines for the proposed municipal power and light plant has been postponed from Oct. 31 to Nov. 7. Bids for four generators will be received Nov. 21 instead of Nov. 7.

TACOMA, WASH.—Pacific Foundry Co., Box 1254 has been incorporated with capital of $15,000.

Dominion of Canada

ST. HYACINTHE, QUE.—Quebec Central Light & Power Co. Ltd., 477 St. Francois Xavier street, Montreal, is preparing plans for constructing a power house and transmission lines. Estimated cost $100,000. C. B. Hibbard, engineer.

WHERE-TO-BUY

BILLETS AND BLOOMS
(*Also Stainless)*
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., Newport, Ky.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
*Ludlum Steel Co., Watervliet, N. Y.
*Republic Steel Corp., Youngstown, O.
Standard Steel Works Co., Burnham, Pa.
The Stanley Works, New Britain, Conn. Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Timken Steel & Tube Co., Canton, O.
Youngstown Sheet & Tube Co., Youngstown, O.

BLAST FURNACE SPECIALTIES
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh, Pa.

BLAST FURNACES—See FURNACES (Blast)

BLOCKS (Chain)
Ford Chain & Block Co., York, Pa.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

BLOWERS
Coppus Engineering Co., 359 Park Ave., Worcester, Mass.
General Electric Co., Schenectady, N. Y.
Ingersoll-Rand Co., Phillipsburg, N. J.
Strong, Carlisle & Hammond Co., The, 1400 W. 3rd St., Cleveland, O.

BOILER HEADS
Bethlehem Steel Co., Bethlehem, Pa.

BOILER TUBES—See TUBES (Boiler)

BOILERS
Murray Iron Works Co., Burlington, Iowa.

BOLT AND NUT MACHINERY
Landis Machine Co., Waynesboro, Pa.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

BOLTS
(*Also Stainless)*
Bethlehem Steel Co., Bethlehem, Pa.
Illinois Steel Co., 208 S. La Salle St., Chicago, Ill.
Jones & Laughlin Steel Co., Jones & Laughlin Bldg., Pittsburgh, Pa.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh, Pa.
*Republic Steel Corp., Upson Nut Div., 1912 Scranton Rd., Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.

BORING MACHINES (Horizontal)
Landis Tool Co., Waynesboro, Pa.

BOSH PLATES (Copper)
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.

BOXES (Annealing)
United Engineering & Foundry Co., First National Bank Bldg., Pittsburgh, Pa.
Wilson, Lee, Engineering Co., 1370 Blount St., Cleveland, O.

BOXES (Case Hardening)
Driver-Harris Co., Harrison, N. J.
Strong, Carlisle & Hammond Co., The, 1400 W. 3rd St., Cleveland, O.

BOXES (Open Hearth Charging)
Morgan Engineering Co., The, Alliance, O.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

BRAKES (Electric)
Clark, The, Controller Co., 1146 E. 152nd St., Cleveland, O.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland, O.

BRAKES (Press)
Cincinnati Shaper Co., Elam and Garrard Sts., Cincinnati, O.

BRICK—(Insulating)—See INSULATING BRICK

BRICK (Refractory)—See REFRACTORIES, CEMENT, etc.

BRICK (Silicon Carbide)
Carborundum Co., The, Perth Amboy, N. J.
Norton Co., Worcester, Mass.

BRIDGE CRANES (Ore and Coal Handling)
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

BRIDGES, BUILDINGS, VIADUCTS, STACKS
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
Belmont Iron Works, 22nd and Washington Ave., Philadelphia, Pa.
McClintic-Marshall Corp., Bethlehem, Pa.
Ohio Structural Steel Co., The, Newton Falls, O.
Truscon Steel Co., Youngstown, O.

BUCKETS (Clam Shell, Dragline, Grab, Single Line)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

BUILDINGS (Steel)—See BRIDGES, ETC.

BURNERS (Acetylene)—See TORCHES AND BURNERS

BURNERS (Automatic)
Surface Combustion Co., 2375 Dorr St., Toledo, O.
Wean Engineering Co., Warren, O.
Wilson, Lee, Engineering Co., 1370 Blount St., Cleveland, O.

BURNERS (Fuel, Oil, Gas, Combination)
Surface Combustion Co., 2375 Dorr St., Toledo, O.
Wean Engineering Co., Warren, O.
Wilson, Lee, Engineering Co., 1370 Blount St., Cleveland, O.

BUSHINGS (Bronze)
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
Gifford Engine Co., Lansing, Mich.
Rhoades, R. W., Metaline Co., 50—3rd St., Long Island City, N. Y.
Shenango-Penn Mold Co., Dover, O.

BUSHINGS (Oilless)
Rhoades, R. W., Metaline Co., 50—3rd St., Long Island City, N. Y.

BUSHINGS (Steel)
Gifford Engine Co., Lansing, Mich.

BUSINESS CARDS (Engraved)
Modern Card Co., 1153 Fullerton Ave., Chicago, Ill.

BY-PRODUCT PLANTS
Koppers Construction Co., 1438 Koppers Bldg., Pittsburgh, Pa.

CADMIUM
The Udylite Co., 1615 E. Grand Blvd., Detroit, Mich.

CADMIUM PLATING PROCESS
The Udylite Co., 1615 E. Grand Blvd., Detroit, Mich.

CAR DUMPERS
Industrial Brownhoist Corp., Bay City, Mich.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

CAR PULLERS and SPOTTERS
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

CARBIDE
Linde Air Products Co., 30 E. 42nd St., New York City.
Shawinigan Products Corp., Empire State Bldg., New York City.

CARS (Charging)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Morgan Engineering Co., The, Alliance, O.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

CARS (Industrial and Mining)
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland.
Bethlehem Steel Co., Bethlehem, Pa.

CARS (Scale)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.

CASTINGS (Acid Resisting)
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
International Nickel Co., Inc., 67 Wall St., New York City
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Shenango-Penn Mold Co., Dover, O.

CASTINGS (Alloy Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Forging & Casting Corp., The, Ferndale, Mich.
Industrial Steel Casting Co., 2237 Water Works Drive, Toledo, O.
Pittsburgh Rolls Corp., 41st and Willow Sts., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

CASTINGS (Brass, Bronze, Copper, Aluminum)
Aluminum Industries, Inc., 2348 Beekman St., Cincinnati, O.
Bethlehem Steel Co., Bethlehem, Pa.
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
Cramp Brass & Iron Foundries Co., Paschall Sta., Philadelphia, Pa.
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Morgan Engineering Co., The, Alliance, O.
Shenango-Penn Mold Co., Dover, O.
Titan Metal Mfg. Co., Bellefonte, Pa.

CASTINGS (Brass, Pressure)
Titan Metal Mfg. Co., Bellefonte, Pa.

CASTINGS (Electric Steel)
Industrial Steel Casting Co., 2237 Water Works Drive, Toledo, O.
West Steel Casting Co., 805 E. 70th St., Cleveland, O

CASTINGS (Gray Iron, Alloy, or Semi-Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Cramp Brass & Iron Foundries Co., Paschall Sta., Philadelphia, Pa.
Erie Foundry Co., Erie, Pa.
Forging & Casting Corp., The, Ferndale, Mich.
Forest City Foundries Co., 2500 W. 27th St., Cleveland, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Murray Iron Works, Burlington, Iowa.
National Roll & Foundry Co., The, Avonmore, Pa.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

CASTINGS (Heat Resisting)
Driver-Harris Co., Harrison, N. J.

CASTINGS (Malleable)
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Lake City Malleable Co., 5026 Lakeside Ave., Cleveland, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Peoria Malleable Castings Co., Peoria, Ill.

CASTINGS (Steel)
(*Also Stainless)*
Bethlehem Steel Co., Bethlehem, Pa.
Industrial Steel Casting Co., 2237 Water Works Drive, Toledo, O.
Mackintosh-Hemphill Co., 9th & Bingham Sts., Pittsburgh.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.
*Midvale Co., The, Nicetown, Philadelphia, Pa.
National Roll & Foundry Co., The, Avonmore, Pa.
Pittsburgh Rolls Corp., 41st and Willow Sts., Pittsburgh, Pa.
Standard Steel Works Co., Burnham, Pa.
Strong Steel Foundry Co., 33 Norris Ave., Buffalo, N. Y.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.
West Steel Casting Co., 805 E. 70th St., Cleveland, O.

CASTINGS (Worm & Gear Bronze)
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.

CEMENT (High Temperature)
Carborundum Co., The, Perth Amboy, N. J.
Norton Company, Worcester, Mass.
Strong, Carlisle & Hammond Co., The, 1400 W. 3rd St., Cleveland.

CHAIN (Draw Bench)
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

CHAIN (Malleable)
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Lake City Malleable Co., 5026 Lakeside Ave., Cleveland, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

CHAIN (Sprocket)
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Peoria Malleable Castings Co., Peoria, Ill.

CHAIN (Steel-Finished Roller)
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

CHARGING MACHINES (Cupola)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O
Morgan Engineering Co., The, Alliance, O.

CHARGING MACHINES (Open Hearth)
Morgan Engineering Co., The, Alliance, O.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

CHECKS (Metal)
Cunningham, M. E., Co., 107 E. Carson St., Pittsburgh, Pa.

CHROME ORE
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia.

CHROMIUM METAL
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

CLEANING SPECIALTIES
American Chemical Paint Co., Ambler, Pa.